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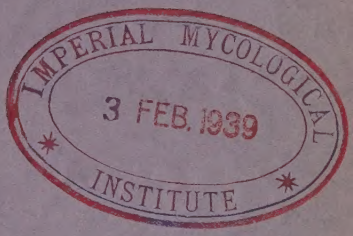

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 9.] February, 1939. [No. 2

DISEASES CAUSED BY BACTERIA AND FUNGI

I. CAVANAUGH, G. W. (1936). **Mastitis and Carbohydrate Deficiency.**—*Proc. 29th Conv. internat. Ass. Milk Dlrs. 1936.* Prod. Sect. pp. 45-54.

II. DAHLBERG, A. C., KUCERA, J. J., HENING, J. C., & HUCKER, G. J. (1936). **Composition of Milk as Affected by Sub-Clinical Mastitis.**—*Ibid.* pp. 54-67. 9 tables. [Also appeared in *Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 195-204].

III. BURKEY, L. A., MEIGS, E. B., SANDERS, G. P., & CONE, J. F. (1936). **The Significance of Bacterial and Chemical Changes Occurring in Mastitis Milk.**—*Ibid.* pp. 67-70.

IV. LITTLE, R. B. (1936). **Mastitis Detection and Control.**—*Ibid.* pp. 71-87. 1 table, 3 graphs. [12 refs.]

V. HUCKER, G. J. (1936). **The Presence of Mastitis Streptococci in Bovine Mammary Tissue. (Preliminary Report).**—*Ibid.* pp. 87-92. 1 table. [6 refs.]

VI. —. (1936). **Discussion of Mastitis.** [Speakers: ANDERSON, E. O., CASE, C. H., & UDALL, D. H.]—*Ibid.* pp. 92-98.

I. The author supports, and quotes at length, some observations reported by WIEDMANN [*V. B.* **4.** 6.] that diet may have an influence on the growth of bacteria in the udder and the changes produced in the milk and, in particular, that a deficiency of carbohydrates may predispose to obvious symptoms.

II. The data on which this report is based have already been dealt with [*V. B.* **8.** 195].

III. The authors believe that careless handling, rough milking practices, poor milkers and the abuse of milking machines, are of considerable importance in the development of obvious mastitis. The use of milking machines at a high vacuum and the practice of leaving them on the cow longer than is reasonably necessary to obtain all the milk appears to increase the chloride content of the milk from cows showing no symptoms of mastitis. Cows which when carefully milked give normal milk show increasing symptoms of mastitis following the use of severe

machine-milking. On the other hand, mastitis-infected cows which have been milked by severe machine-milking are greatly improved after milking by hand.

IV. L. discusses the result of attempts to transmit mastitis, including those carried out by JONES and himself, and discusses the commonly accepted view that the organisms enter *via* the teat canal. He describes the production of typical chronic mastitis with a strain which was apparently *Str. agalactiae*, and of acute mastitis with a strain which corresponded to the Group II mastitis streptococci of British workers, small numbers of streptococci being introduced *via* the teat in each case by means of a small glass rod with a bead on the end. He regards the common chronic mastitis as being the more serious form in America and describes the well known symptoms that are recognized in Great Britain. In his opinion, laboratory examination is superior to any other single method for the control of mastitis, but he describes and discusses certain of the indirect methods which may be of assistance.

V. The data on which this report is based have already been dealt with [*V. B.* **8.** 195].

VI. In this discussion, ANDERSON referred to the successful results of control based on the examination of milk samples at the Storrs Experimental Station. He also referred to the occurrence of mastitis due to coliform organisms in some of the cases. CASE reported that the administration of 500 c.c. of 12% lactose solution intravenously twice a week for two weeks was followed by decreased alkalinity and bacterial content of the milk, but that this change was of a temporary nature [number of animals not stated]. He also recorded an instance of a herd in which obvious symptoms of mastitis followed milking by a notoriously fast milker, and in which the symptoms disappeared when milking was more normal. He referred also to the importance of bruises or injuries. UDALL emphasized his view that expert clinical examination is as effective in detecting early cases as any other method.—A. W. STABLEFORTH.

PROUTY, C. C., & MCCULLOCH, E. C. (1937). **Bacterial Development in Milk from Udder Quarters Infected with Mastitis and Its Effects on the Quality of Milk and Dairy Products Therefrom.**—*Rep. Wash. St. agric. Exp. Sta., 1937.* p. 30.

Mastitis milk has a growth-retarding effect on numerous test organisms, especially *Streptococcus lactis*. This effect is marked in mixtures of normal and abnormal samples of milk up to a ratio of 1 : 4. This property is not affected by reducing the pH of mastitis milk to that of normal milk, but pasteurization is more effective in destroying this property if the pH is first adjusted.—H. E. BYWATER.

I. BROWN, J. H. (1936). **Double-Zone Beta Haemolytic Streptococci.**—*Proc. 25th-28th Conf. Amer. Ass. Med. Milk Comm. 1922-1935.* pp. 238-246. 1 table.

II. BROWN, J. H. (1937). **Appearance of Double-Zone Beta Haemolytic Streptococci in Blood Agar.**—*J. Bact.* **34.** 35-48. 3 figs. on 3 plates. [18 refs.]

III. BLISS, Eleanor A. (1937). **Studies upon Minute Hemolytic Streptococci. III. Serological Differentiation.**—*Ibid.* **33.** 625-642. 7 tables. [11 refs.]

IV. EVANS, Alice. (1937). **Studies on Haemolytic Streptococci. IV. Streptococcus Scarlatinae.**—*Ibid.* **34.** 21-33. 2 tables. [18 refs.]

I. In this report, B. describes with numerous photographs the characters of certain streptococci which formed double-zones in poured blood agar plates which had been incubated and subsequently refrigerated. After 24 or 48 hours' incubation, the colony was surrounded by a clear beta zone, often with a hazy

margin. After some hours in the cold (or sometimes at room temperature) the colony became surrounded by a broad secondary band of haemolysis, separated from the first by a fairly distinct ring of corpuscles which were not haemolysed or altered in colour. The property of forming these double zones was stable, not having been lost by any of 150 strains, many under observation for a number of years. These strains came from both human and animal sources.

Descriptions of possibly similar strains by other workers are discussed. The appearance was most clearly shown in rabbit blood agar plates with 5-10% blood, and favoured by certain peptones and a slightly alkaline reaction. Observations are reported showing that the unhaemolysed corpuscles in the intermediate ring are not " fixed " in the manner characteristic of an alpha strain.

II. This is substantially the same as I, above.

III. B. studied by means of the precipitation and slide agglutination methods the group and type differentiation of 55 strains of the so-called " minute haemolytic streptococci ", *i.e.*, briefly, streptococci which produce a minute colony surrounded by a relatively very wide beta-haemolytic zone in poured blood-agar plates.

Fifty of these strains fell into one group, that to which LANCEFIELD has assigned the letter " F ", and to which no " ordinary " beta haemolytic streptococci have yet been found to belong. Five strains belonged to LANCEFIELD'S group G, which also contains other haemolytic streptococci [notably those from dogs].

The fifty group F strains could be divided into four types : type 1 contained 30 strains, type 2 thirteen strains, type 3 six strains and type 4 one strain. The five group G strains were all of one type and, curiously, the type antigen of these strains could not be distinguished from that of type 1 of the group F strains. Grouping of the " minute " haemolytic streptococci was found to be extremely difficult because of their extreme type specificity.

IV. E. examined the characters of 395 strains of haemolytic streptococci isolated from various human sources. In the second paper of this series dealing with *Str. pyogenes*, she stated that 61·6% of 120 scarlet fever strains had the characteristics of that species. Strains from a variety of other streptococcus infections were also classified as *Str. pyogenes*.

A group of 14 strains, all from scarlatina, is now described. They do not ferment salicin, and it is suggested that they should be given specific rank and called *Str. scarlatinae* (synonym *Str. anginosus*). The strains of this group all showed weak fibrinolytic properties. It is concluded that they may cause scarlet fever or sore throat without rash, but are rarely, if ever, the cause of other diseases.

—A. W. STABLEFORTH.

SHERMAN, J. M. (1937). **The Streptococci.**—*Bact. Rev.* **1.** 3-97. 5 tables. [Numerous refs.]

S. confines his review to the biochemical characters of the streptococci, with reference to their value for purposes of classification, and specifically excludes the technical importance of the streptococci as agents of disease and in industry, questions relative to nutrition, growth and general physiology (except where they contribute to a systematic synthesis), serological methods other than those which refer to broad groups, and variation. No attempt is made to discuss previous reviews. Methods are not discussed in detail.

Much of the material is put in tabular form, and the streptococci are first separated into a number of primary divisions based on :– haemolysis growth at 10°C. and 45°C.; growth in the presence of 0·5% NaCl, in a highly alkaline medium (pH 9·6) and in the presence of 0·1% methylene blue; reducing properties; survival at 60°C. for 30 minutes, and the production of ammonia from peptone. The

broad primary divisions thus made are as follows :– the pyogenic streptococci, the *viridans* streptococci, the lactic streptococci and the enterococci. Emphasis is particularly laid on the value of the temperature limits of growth.

Each of these broad primary divisions is then discussed in more detail. Within the pyogenic division are included :– *Str. pyogenes* (Lancefield's Group A); *Str. mastitidis* or *agalactiae* (Group B); *Str. equi*, the so-called animal *pyogenes* and the human "C" (all members of Group C); and streptococci belonging to Lancefield's Groups G, E and H. Due tribute is given to the work of Lancefield in regard to the broad group classification of haemolytic streptococci by serological methods. A table is given of the reactions of these organisms in the following tests :– fibrinolysis, hydrolysis of sodium hippurate, starch hydrolysis, aesculin splitting, growth on 40% bile-blood agar, curdling of milk, final pH in glucose broth, and the production of acid from arabinose, maltose, saccharose lactose, trehalose, raffinose, inulin, glycerol, mannitol, sorbitol and salicin. The value of these various differential tests is discussed and the usefulness of the fibrinolysin test, the sorbitol and trehalose tests, splitting of sodium hippurate and splitting of aesculin is emphasized, due regard being given to the fact that certain of these tests are only of value in the characterization of particular species or sub-divisions. It is suggested that it might be useful to make greater use of the temperature limits of growth, action on milk, fermentation of raffinose, methylene-blue tolerance test and hydrolysis of starch.

The *viridans* group, as defined by the author, is regarded as the least satisfactory of the primary divisions and only of temporary usefulness, because the known species or types probably represent only a fraction of the streptococci which fall into this group. [It might be remarked here that certain well defined streptococci associated with the more acute forms of bovine mastitis and which are definitely pyogenic are not referred to]. It is concluded that the further differentiation of this primary division must rest entirely on physiological characters for the present. In general, the streptococci in this group possess a high minimum and maximum temperature of growth, a weak reducing action, a limited tolerance to methylene blue, salt and alkali, and an inability to produce ammonia from peptone. Additional characters are given for the various members of this group, which includes *Str. salivarius*, *Str. equinus*, *Str. bovis* (several variants) and *Str. thermophilus*.

The *lactis* division is regarded as a homogenous and quite distinct group and includes *Str. lactis* and *Str. cremoris*. The streptococci of this division are distinguished from the pyogenic and *viridans* divisions by their ability to grow at 10°C., strong reducing action and tolerance to relatively concentrated solutions of methylene-blue in milk, and, on the other hand, from the enterococci by their inability to grow at 45°C. or in the presence of a high percentage of sodium chloride (6·5 per cent.), the inhibition of growth in an alkaline medium, and a somewhat lower thermal resistance. Additional characteristics of these organisms are given and it is concluded that there are many variants.

The *enterococcus* division is looked upon as containing faecal cocci occurring in diplococcus or short chain forms, somewhat resistant to heat, with an ability to ferment mannitol and a tolerance for bile. Other characters are tabulated and discussed and it is remarked that the properties of the members of this group, *viz*, *Str. fecalis*, *Str. liquefaciens*, together with *Str. zymogenes* and *Str. durans* (both Lancefield's Group D) merge somewhat into one another and into those of other primary divisions of streptococci, and that two of the members, *viz*, *Str. zymogenes* and *Str. durans*, are haemolytic, whilst certain organisms are proteolytic.

In conclusion, S. comments, amongst other things, that in an effort to find a few definitive tests for specific purposes, many of the older tests have been discarded,

although they are of great value for dealing with the problem of streptococcus classification as a whole, and that, whilst no one physiological test is infallible, the study of streptococci by means of a large series of reactions enables individual strains, even although atypical with respect to some character which is usually most constant, to be identified with considerable assurance. He has, with success, attempted to bring into relation some of the facts known regarding the various streptococci.

This sketch of Sherman's review can convey only an inadequate impression of the ground which he has covered or of the value of his contribution. The review itself will be read with profit by all who are interested in the streptococcus group, and will be particularly valuable to those whose interests lie mainly in one particular section.—A. W. Stableforth.

Dolman, C. E., Wilson, R. J., & Cockroft, W. H. (1936). **A New Method of Detecting Staphylococcus Enterotoxin.**—*Canad. publ. Hlth J.* **27.** 489-493. [8 refs.]

The authors describe experiments carried out to determine the susceptibility of kittens to staphylococcus enterotoxin. They found that, except in one case, intraperitoneal injections of from 0·5-2·5 c.c. of filtrate set up a characteristic syndrome, with vomiting, diarrhoea and lassitude. In one fatal case in a kitten, no gross inflammatory changes were found in the gastro-intestinal tract; the authors conclude therefore that this enterotoxin can no longer be regarded as a direct gastro-intestinal irritant, and they suggest that further work is needed on the pharmacology of the condition.

The authors' view is that kittens are more suitable subjects for detection of this enterotoxin than monkeys, as the kitten's susceptibility is at once more marked and more regular. The article points out that heating and formaldehyde treatment which destroy staphylococcal exotoxins will frequently not affect the virulence of the endotoxins; it is therefore urged that no staphylococcus toxoid for human beings should be used unless 3 c.c., injected intraperitoneally into a normal kitten, produces no symptoms.

Chapman, G. H., Lieb, C. W., & Curcio, Lillian G. (1938). **The Use of Bromthymol Blue Agar and Phenol Red Mannitol Agar for the Isolation of Pathogenic Types of Staphylococci.**—*Amer. J. clin. Path.* **8.** Suppl. to No. 1. 3-11. 3 tables. [3 refs.]

Phenol red-mannitol agar and bromthymol blue agar were used; after incubation for 18-48 hours, typical or suspicious staphylococcal colonies were isolated from both media and subjected to a series of six *in vitro* tests for pathogenicity:—pigment formation on proteose-lactose agar, haemolysis, coagulase formation and behaviour on crystal violet agar, bromthymol blue agar and Difco-phenol red-mannitol agar. Comparison of the results suggested that a combination of both media should be used to isolate the maximum number of pathogenic staphylococci.
—R. O. Muir.

Sterne, M. (1937). **The Effects of Different Carbon Dioxide Concentrations on the Growth of Virulent Anthrax Strains. Pathogenicity and Immunity Tests on Guinea-Pigs and Sheep with Anthrax Variants derived from Virulent Strains.**—*Onderstepoort J. vet. Sci.* **9.** 49-67. 10 tables. [7 refs.]

A number of virulent anthrax strains were grown on 50% serum-agar in different concentrations of CO_2. Under these conditions all the strains grew smooth mucoid, and rapidly produced avirulent, rough, uncapsulated variants

which had the power of eliciting a very satisfactory immunity to anthrax in g. pigs and sheep. These strains could be obtained in a considerable range of CO_2 concentration, and the tests conducted on sheep indicated, as far as laboratory tests could, that vaccines prepared from avirulent strains are efficient and entirely safe.

No difficulty was met with in obtaining avirulent strains from any virulent culture, and the preliminary tests on g. pigs gave a good indication of the results to be expected in tests on sheep.

I. Doladilhe, M. (1936). Sur une propriété physique d'un des constituants de la fraction non dialysable d'un sérum sanguin. [**On a Physical Property of one of the Constituents of the Non-Dialysable Fraction of a Blood Serum**]. —*C. R. Acad. Sci., Paris.* **203.** 1295-1296. [8 refs.]

II. Placidi, L., & Morel, C. (1937). Sur une propriété particulière de la protéine visqueuse du sérum anticharbonneux. [**A Peculiarity of the Protein of Anthrax Antiserum**].—*C. R. Soc. Biol. Paris.* **125.** 234-236. [4 refs.]

I. By adding distilled water saturated with CO_2 to normal serum, a flocculate is formed which can be recovered in solution by physiological saline. It is abundant, viscous, slightly coloured and is insoluble in water. This serum fraction has been shown to play an important part in precipitation tests.

II. The authors report a result similar to that recorded in I, and show that the precipitin of anti-anthrax serum is located in the viscous protein fraction. Details of the separation of this protein are given.—Gwilym O. Davies.

I. Schaefer, W. (1938). Titrage de l'antigène et de l'anticorps capsulaire de la bactéridie charbonneuse selon la méthode de G. Ramon. [**Titration of the Capsular Antigens and Antibodies of *B. anthracis* by Ramon's Method**]. —*C. R. Soc. Biol. Paris.* **127.** 256-259. 4 tables.

II. Takahashi, Y. (1938). Dissociation de la bactéridie charbonneuse à partir d'un germe unique. [**Dissociation of *B.a.* Starting from a Single Cell Culture**].—*Ibid.* 399-402. [1 ref.]

I. S. found that Ramon's flocculation test could be applied for the titration of capsular antigens and antibodies of *B.a.* Two methods may be used, the one with fixed quantities of antigen and variable quantities of antiserum, the other with constant doses of antiserum and variable quantities of antigen. S. compares the two methods, and points out that exact determination is more difficult with the first method.

II. By micromanipulation technique a series of anthrax cultures were obtained from a single smooth anthrax organism ; T. showed that by using various methods dissociation of these cultures may be produced, either *in vitro* or *in vivo*. These changes are linked up with modifications of the organisms which particularly concern capsule formation and virulence.—Gwilym O. Davies.

Carmichael, J. (1937). **A Brief Note on Tuberculosis in Tropical Africa with Special Reference to Uganda.**—*J. comp. Path.* **50.** 383-385.

C. outlines the investigations carried out in 1937 on TB. in Uganda. These include :- (1) the incidence of TB. in cattle and other animals and typing of strains ; (2) investigation into the susceptibility of the zebu type of cattle as compared with other breeds, and (3) the isolation and typing of strains of human origin.

The long-horned ankole cattle are severely affected, and double intradermal tests performed indicated that as many as 80 % may be infected, while an incidence of over 40 % is revealed by abattoir returns. Zebu cattle show little susceptibility, judging by the results of tuberculin tests.

Twelve cases in sheep were investigated, and of these 11 proved to be due to the bovine type of organism and one to the human type. Eleven cases in goats were found to be due to the bovine type. Pulmonary TB. is the usual form of the disease in human beings in Uganda. Of 250 specimens of human sputum received for examination, four yielded tubercle bacilli of bovine type.—S. J. GILBERT.

I. WILKIE, J., EDWARDS, S. J., FOWLER, A. B., & WRIGHT, N. C. (1937). **The Relative Values of Raw and Pasteurized Milk in the Feeding of Calves.** —*J. Dairy Res.* **8.** 311-323. 9 tables. [8 refs.]

II. EDWARDS, S. J. (1937). **The Pathogenesis of Tuberculosis in Calves.**—*J. comp. Path.* **50.** 377-382. 1 table. [7 refs.]

III. RAUTMANN, H. (1938). Ueber die Ausbreitungswege der Tuberkulose bei Kälbern bis zu 14 Tagen. [**Pathogenesis of TB. in Calves up to 14 Days of Age**].—*Berl. tierärztl. Wschr.* May 13th. 279-282.

IV. MACHENS, M. (1938). Die Auswirkungen der Anzeigepflicht der Kälbertuberkulose. [**Experience in Obligatory Notification of TB. in Calves**].—*Ibid.* 282-283.

I. A total of 73 calves completed a feeding trial extending over a period of 12 weeks. At the beginning of the experiment the animals, which were obtained from tuberculin tested Ayrshire herds, were 2-3 days old. During the first eight weeks the animals were fed exclusively on milk from a local depot, 36 calves receiving raw milk, and the remainder the same milk after commercial pasteurization. From the eighth to the 12th week a supplement of hay was provided in addition to the milk. The two groups were housed in isolated huts, but no attempt was made within each group to prevent contact between calves. Milk was heated to 100°F. and fed from teat buckets. At the end of the trial the animals were tested by the double intradermal test with synthetic tuberculin, and were then slaughtered.

Inoculation into g. pigs of 47 grouped samples of raw milk showed the presence of viable tubercle bacilli in 33. Of 45 samples of the same milk after pasteurization none showed infection.

Of the 36 calves fed raw milk, 24 reacted to tuberculin and 23 showed the presence of TB. at autopsy. In the group fed pasteurized milk, one animal reacted to the tuberculin test, but no lesions were found at autopsy, and g. pig inoculation failed to show the presence of tubercle bacilli.

Tuberculous calves showed lesions restricted to the pleural cavity—lungs and bronchial and mediastinal lymph nodes. No lesions were found in the mesenteric or pharyngeal lymph nodes. Although no precautions were taken to prevent respiratory infection within the group, this is unlikely to have been the route of infection in all the animals. The findings support the contentions of CALMETTE [*V. B.* **7.** 359.] and his colleagues, *viz*, that tubercle bacilli can penetrate the intestinal mucosa, reach the mesenteric lymph nodes and eventually produce pulmonary lesions without leaving any evidence at their portal of entry (occult infection). In man and bovines, ingestion is considered the most important route of infection. It is possible that the ingestion over a period of days of very small doses of tubercle bacilli may have been followed by absorption and passage through the mesenteric lymph nodes without sufficient stimulation to evoke a macroscopic lesion ; a large single dose—as has usually been employed in experimental work—would probably have produced a visible primary lesion in the mesenteric lymph nodes. No significant difference was noted in the growth of the two groups of calves.

II. A brief account of the matter in I.

III. By means of a questionnaire the distribution and character of the lesions in 174 cases of TB. in calves slaughtered within 14 days of birth was recorded in a number of abattoirs. In 35 animals isolated TB. of the liver and portal lymph nodes was detected ; in all the remaining calves generalization had already occurred. The lungs were involved in 114 cases, by the ductus venosus, posterior vena cava, or from the mediastinal lymph nodes.

The port of infection was by the umbilical vein or by the amniotic fluid ; in the latter case the primary lesions were found in the mesenteric lymph nodes. The former is the more common route of infection and the direct transference of the bacilli in the venous blood favours generalization.

IV. During the past five years, notification of cases of TB. in calves under three months old, found at meat inspection, has been made compulsory in Brunswick. In each case the cow must be traced and samples of sputum, uterine secretion and milk submitted to a laboratory for examination. Unfortunately complete sets of samples were not received from each animal, but the results indicate considerable success in picking out tuberculous cows.

Of 151 cows from which samples were examined, 87 were found to be tuberculous. Pulmonary TB. was found in 66 animals, udder TB. in 19, and uterine TB. in 51 animals.

The large number of cases of tuberculous metritis detected in this way is especially important. Constant changing of ownership often makes it extremely difficult to trace individual cows.

In 29 samples of sputum and uterine secretion in which no tubercle bacilli were found on direct microscopic examination, the use of antiformin was successful in revealing them without recourse to g. pig inoculation.—E. G. WHITE.

FELDMAN, W. H. (1938). **Generalised Tuberculosis of Swine due to Avian Tubercle Bacilli.**—*J. Amer. vet. med. Ass.* **92.** 681-685. 1 table. [6 refs.]

Avian type tubercle bacilli are responsible for most of the cases of localized TB. of swine in the United States, and it is generally believed that this type is a non-progressive disease of lymph nodes.

Material was obtained from an abattoir where most of the slaughtered swine came from districts in which TB. of fowls was prevalent. In a period of 11 months, 117,963 swine were slaughtered, and 18% proved tuberculous, 89 carcasses being condemned on account of generalized TB. The investigations were made from 28 carcasses showing generalization and from two others severely affected. Various organs were used and cultural tests and the inoculation of rabbits and g. pigs were performed in identifying the organism. Avian tubercle bacilli were found to be the sole aetiological agent in 24 out of the 26 cases in which tubercle bacilli were demonstrated ; in two cases bovine tubercle bacilli were obtained, and results were negative in four others. F. concludes that, although avian TB. of swine is predominantly a localized disease of the lymph nodes, the lesions may become widely distributed and may involve such organs as the liver, spleen, lungs and kidney.—S. J. GILBERT.

I. CORPER, H. J., COHN, M. L., SIMPSON, M. G., & BOWER, C. (1937). **The Effect of Radio Short-Waves on Tubercle Bacilli and Tuberculosis.**—*Amer. Rev. Tuberc.* **36.** 763-772. 3 figs. [16 refs.]

II. CORPER, H. J., & COHN, M. L. (1938). **Some Fundamental Investigations on the Resistance of Tubercle Bacilli.**—*J. Bact.* **35.** 223-233. 2 figs., 6 tables. [9 refs.]

I. Radio short-wave therapy is thought to owe its effect mainly to the heat

generated, but it has been claimed that these waves have specific healing action on inflammatory and suppurative processes, apart from their heating action.

Experiments here described in detail showed that radio short-waves had no effect on cultures of tubercle bacilli *in vitro*, or on experimentally infected tuberculous g. pigs.

It is concluded that radio short-waves have no specific biologic effect on tubercle bacilli or on lesions caused by them.

II. A detailed description is given of the technique employed in experiments carried out to ascertain the thermolability of human strains of tubercle bacilli and their resistance to the action of acetic acid.

It was deduced that the type of media on which test-cultures are grown influences their resistance both to heat and to acetic acid. Cultures grown on egg medium containing broth showed higher resistance in this respect than did those grown on broth-free media or on glycerin-broth media. The age of cultures, within limits, had no influence on this resistance. Avian tubercle bacilli cultured under identical conditions with human tubercle bacilli showed relatively greater resistance to heat and to acetic acid.—H. Burrow.

Smithburn, K. C. (1938). **Effect of Age of the Host on Resistance to Tuberculous Infection.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 575-577. [2 refs.]

A series of experiments were made on g. pigs to ascertain whether or not age had any relation to resistance to TB. One bovine and two human strains of the organism were used. The g. pigs were inoculated intracerebrally, and the length of the period of survival was taken as an index of resistance. Young animals were more resistant than old, and resistance decreased progressively with age.—D. D. O.

Willis, H. S., & Woodruff, C. E. (1938). **Tuberculosis in Allergic and Desensitized Guinea Pigs.**—*Amer. J. Path.* **14.** 337-346. 12 figs. on 3 plates. [12 refs.]

The authors give details of experiments made to compare the effect of inoculation of virulent tubercle bacilli into g. pigs rendered allergic, and into corresponding groups which had been rendered allergic and then desensitized by repeated inoculation of tuberculin.

The desensitized group all died much earlier than did the allergic group. While the chief lesions in the allergic group were observed in the liver and spleen, those in the desensitized group consisted primarily of miliary tubercles in the lungs, and the liver and spleen remained free. It is deduced that the state of allergy has a restraining influence on the growth and dissemination of tubercle bacilli within the body.—H. Burrow.

I. Yanagisawa, K., & Ando, K. (1937). **Studies on B.C.G. (Second Report).** —*Jap. J. exp. Med.* **15.** 295-302. 4 tables. [9 refs.] [In English]. [See also *V. B.* **6.** 396].

II. Schwartz, R. (1938). Prémunition antituberculeuse du cobaye par instillations répetées de BCG sur la conjunctive. [**Premunition against TB. by Repeated Instillation of BCG into the Conjunctiva**].—*C. R. Soc. Biol. Paris.* **127.** 205-207. [2 refs.]

III. Schwartz, R. (1938). Prémunition antituberculeuse du cobaye par l'immunisation " concentrée " avec le BCG. [**" Concentrated " Immunization with BCG**].—*Ibid.* 779-781. [1 ref.]

IV. Tunaru, C. (1938). Sur la persistance à l'état vivant des bacilles biliés Calmette-Guérin dans l'organisme du cobaye. [**The Viability of BCG in the Guinea Pig**].—*Ibid.* 740-741.

V. Tunaru, C. (1938). Caractères des bacilles Calmette-Guérin ayant séjourné des temps variables dans la cavité péritonéale des cobayes. **[Effect on BCG of Maintenance in the Peritoneal Cavity of Guinea Pigs]**.—*Ibid.* 742-744. [1 ref.]

I. Three groups of 25 g. pigs each, shown to be negative to tuberculin, received 1·0 mg., 0·1 mg. and 0·01 mg. doses of BCG respectively at intervals spread over 2 weeks. A further group of 25 g. pigs did not receive these injections. The skin sensitivity was tested at the end of the first, eighth and twelfth months after the last injection. At the end of about a year all survivors in all groups received 0·01 mg. of a virulent human strain of tubercle bacilli subcutaneously.

The results of the skin sensitivity tests indicated that the g. pigs receiving the largest dose of BCG remained sensitive to tuberculin longest, and became sensitive to it more quickly than those which received the smaller doses.

The results of autopsies, made on all groups 20 weeks after the injection of the virulent human strain, showed that those receiving the largest dose of BCG offered the greatest resistance to infection. The results failed to show any correlation between sensitivity to tuberculin and resistance to infection as indicated by P.M. examinations; g. pigs sensitive to tuberculin were no more and no less resistant than insensitive g. pigs.

II. Calmette and Grysez showed that it was possible to infect g. pigs with TB. by instillation of the virulent organism on to the eye. S. showed, in two series of experiments, that g. pigs which had received repeated instillations of BCG on to the conjunctiva were more resistant to infection by virulent strains of tubercle bacilli than were controls, when the test dose of these organisms was given by the conjunctiva or subcutaneously.

III. In each of two series of experiments, one group of g. pigs received repeated inoculations of BCG at the same site, another received repeated inoculations at different sites, and the third, a single large dose exceeding the total of the separate injections received by the members of the other two groups. The immunized g. pigs and a number of controls later received (subcut.) 0·001 mg. of a virulent culture of a human strain of tubercle bacilli. All the controls died or were killed.

This work indicated that a single large dose of BCG did not give so effective a resistance as small repeated doses and, similarly, though the difference was not so marked, that injections at several sites gave a better resistance than repeated injections into the same site.

IV. T. attempted to increase the virulence of BCG by repeated animal passage, but failed. Sterilized pieces of elder pith were kept in cultures of BCG for 24 hours in an ice-chest. These pieces of pith were then inserted into the peritoneal cavities of g. pigs. They were recovered at varying intervals of time and all were shown to contain the organism. T. does not believe that this was a simple persistence of the organism, but rather a multiplication when protected from the phagocytic mechanism in the presence of sufficient nutrient material.

V. The morphological characters and the staining reactions of bacilli recovered from the elder pith [see IV, above] are described.

In one series of experiments some strains isolated contained both rough and smooth colonies, while others contained smooth colonies only. In a second series, all the cultures obtained contained some rough colonies. G. pigs were inoculated with these cultures subcutaneously, and rabbits intravenously. Control g. pigs and rabbits were inoculated with BCG ordinary strain by similar routes, receiving similar doses of bacilli.

No differences were noted in the local lesions caused by the two types of

organisms in their ability to spread in the body. Sensitivity to tuberculin was similar in the control and in the experimental animals. T. concluded that the virulence of BCG was not increased when kept under the conditions of the experiment in the peritoneal cavity of g. pigs.—L. E. Hughes.

Vianello, G. (1938). Un' enzoozia da mal rossino nei fagiani. [*Erysipelothrix rhusiopathiae* (**Bacillus of Swine Erysipelas**) **Infection in Pheasants**].—*Clin. vet., Milano.* **61.** 234-243. 7 figs. on 2 plates, 2 tables. [11 refs.]

Eighty out of 200 pheasants 2-3 years old died with symptoms and P.M. lesions of septicaemia. An organism was isolated from the heart blood of some of the dead pheasants and was identified on cultural grounds as *E.r.*, details being given. The surviving pheasants were each given 0·5-2 c.c. of antiserum, after which no further losses occurred.

Pathogenicity tests were made with the isolated organism by injection (intravenous, subcutaneous or intramuscular) into 16 fowls and four pheasants; nearly all of them died after 4-30 days' illness. Cross-agglutination tests were made with the pheasant strain and with three porcine strains of *E.r.*, and all behaved alike. Finally, a note is given on the histopathology of *E.r.* infection in birds.

Baker, J. A. (1938). **Tuberculosis of Fish.**—*Thesis, Ithaca.* pp. 33. 5 tables. [10 refs.] [Thesis not published. Abst. prepared from author's MS.]

B. describes an investigation to determine whether spontaneous TB. occurring in cold-blooded animals is due to acid-fast bacilli which ordinarily lead a saprophytic existence, or whether the causative agents possess parasitic specificity.

Cultures of acid-fast bacilli isolated from cold-blooded animals (*Mycobacterium thamnopheos*, *M. marium*, *M. cheloni*, *M. ranae*, and a platyfish strain) and from other sources (*M. butyricum*, *M. phlei*, *M. leprae* Brinkerhoff II, and an aquarium strain) were injected intraperitoneally into goldfish, with no apparent difference in pathogenicity. The rate of multiplication of the bacilli probably determined the lethal powers of the cultures, as fish kept at higher temperatures appeared to be less capable of resisting infection than those held at lower temperatures.

Infection by ingestion seemed much more accurate than the injection method in giving a true index of the pathogenicity of the organism studied. All the organisms proved lethal when injected, but differences in pathogenic powers were noted when the ingestion method was used. Feeding experiments of platyfish, with cultures of platyfish strain, aquarium strain, and *M. leprae* Brinkerhoff II as the inocula, showed that the platyfish strain was the only one of the group possessing definite invasive power. None of the cultures caused infection when fed to goldfish.

A spontaneous outbreak of TB. was observed in platyfish (*Platypoecilus maculatus*). Pure cultures apparently identical, were obtained from eight of 12 fish cultured. This organism, designated the platyfish strain, grew with difficulty on primary isolation, requiring media similar to those needed for cultivation of the mammalian and avian tubercle organisms.

It can be concluded from the study of the spontaneous outbreak of the disease due to the platyfish strain, its cultural characteristics, and the pathogenicity shown when fed to platyfish, that this strain does possess parasitic specificity not possessed by certain saprophytes tested in comparable experiments.—Herbert L. Gilman.

Hagan, W. A. (1938). **Age as a Factor in Susceptibility to Johne's Disease.**—*Cornell Vet.* **28.** 34-40. 2 tables. [1 ref.]

H. has maintained a dairy herd of cattle for 11 years under conditions conducive

to the spread of Johne's disease, which was also kept active by artificial infection of a large proportion of the herd.

Basing his conclusions on symptoms, P.M. lesions and periodical allergic tests by intravenous injection of avian tuberculin, he notes that calves protected from natural infection until they were four months old did not develop the disease ; that many animals appeared able to overcome the disease without showing clinical symptoms ; that among animals artificially infected an age resistance was evident, as none which were two years old before exposure became infected, and that the great majority (15 out of 16) of all fatally infected animals were born in the herd and, therefore, exposed to infection from the first day of life.—C. V. W.

JAUFFRET, R. (1936). La barbone au Cambodge. [**Barbone in Cambodia**].—*Bull. écon. Indochine.* **39.** 725-743. 5 tables, 1 map.

Two important fatal diseases of cattle in Cambodia are rinderpest and pasteurellosis. Morbidity from pasteurellosis varies from province to province according to the density of the cattle population and the rainfall. The disease is most prevalent from May to September (rainy season). After serious epizootics, recovered animals remain relatively immune, and further epizootics are delayed until that acquired immunity has waned.

The virus of rinderpest paves the way for attack by pasteurella, and in these circumstances cases tend to be more severe. The paper quotes cases of simultaneous infection with rinderpest, pasteurellosis and anthrax.

Three forms of pasteurellosis are described. These are classified according to site and prognosis as follows :- (a) lymphatic form, (b) thoracic form, in both of which prognosis is grave, and (c) abdominal form, in which prognosis is favourable.

The lymphatic or oedematous form is usually peracute, death occurring in less than 24 hours from the onset of symptoms. The chief of these are :– sudden onset of illness, the animal standing immobile with straddled limbs ; visible mucous membranes are cyanotic, respirations accelerated, muzzle dry, skin cold and coat staring, and a hot painful swelling appears in the pharyngeal region, increasing rapidly in dimensions and spreading to the neck and shoulder regions ; difficult respiration increases, the animal falls, lies on its side moaning with limbs convulsed, and rapidly dies from asphyxia or syncope. This syndrome is especially frequent in young animals, which die in 6-10 hours, while adults survive this form of the disease for about 48 hours.

The thoracic form, of more rare occurrence, is characterized by general systemic disturbance (fever, cessation of rumination, etc.), coryza and laryngo-tracheitis, rapidly followed by clinical symptoms of pleuro-pneumonia. The accelerated breathing soon becomes noisy (roaring) and the animal usually succumbs in 5-8 days from the onset of symptoms.

The abdominal form of the disease, which is especially frequent in adult animals, is characterized at its onset by obstinate constipation and abdominal pain. The animal is excited, its nose is dry, and it exhibits dyspnoea and slight abdominal tympany. In 36 to 48 hours the intestinal symptoms suddenly develop into those of profuse diarrhoea, often tinged with blood and of offensive odour. This is followed by exudation from mucous membranes and profuse lachrymation. Since cases are usually first seen at this stage of lachrymation and saneous diarrhoea, differentiation from rinderpest is necessary. A detailed description of the skin lesions in rinderpest is given.

Pasteurellosis may be differentiated from malignant catarrh by the constant feature of keratitis which occurs in the latter. Differentiation between the lymphatic

form of pasteurellosis, blackleg and anthrax is discussed. Blackleg is stated to be very rare in Cambodia, while anthrax is differentiated by blood-examination.

Pasteurellosis in Cambodia has also to be differentiated from maize-poisoning. This condition is characterized by deep anorexia, anuria (or dysuria with blood-stained urine) and constipation.

Prophylactic measures against pasteurellosis, *viz*, removal of animals from infected ground and vaccination by the sero-vaccine method, are discussed; the latter method has reduced the mortality from 8·89 % to 1·01 %.—H. Burrow.

Mlinac, F. (1938). Prinos proučavanju infektivnog abortusa ovaca u Južnoj Srbiji uzrokovanog sojem srodnim sa B. typhi abdom. [**Infectious Abortion among Ewes in Southern Serbia, caused by a Micro-Organism closely related to** *Salmonella typhi*].—*Vet. Arhiv.* **8.** 362-372. 2 tables. [11 refs.] [English summary].

In January, 1938, a severe outbreak of abortion among ewes occurred in three districts of Southern Serbia. Autopsy of aborted foetuses revealed haemorrhagic infiltrations and petechiae of internal organs. A micro-organism showing morphological, cultural, serological and biochemical properties closely related to those of *S. typhi* was isolated in pure culture. Blood serum of the ewes that had aborted agglutinated up to a titre of 1 : 800, and the isolated cultures were agglutinated by stock human typhoid serum up to a titre of 1 : 1,600. Experimental abortion was induced in two ewes that were infected with the isolated culture, and the same strain was isolated from the aborted lamb.

Owing to the fact that the above outbreak occurred in districts in which typhoid fever in man was endemic, M. discusses the possibility of a causal connexion between human typhoid and abortion in ewes. Ewes are in all probability not susceptible to typhoid fever, but if they came in contact with typhoid bacilli their foetuses might be infected, with resultant abortion. Further investigations are to be made to ascertain to what extent ewes so affected might be carriers of typhoid fever.
—B. Oswald (Križevci).

Gojković, D. (1937). Enzootički paratifni zarazni pobačaj kobila u seljačkim gospodarstvima. [**An Outbreak of Paratyphoid Abortion of Mares**].—*Jugoslov. vet. Glasn.* **17.** 455-457. 2 tables. [Numerous refs.]

In 1935 and 1936 a severe outbreak of abortion affecting over 80 % of the mares was recorded in the north-western regions of Yugoslavia. From two aborted foetuses a paratyphoid strain was isolated in pure culture. On account of its morphological, biological, cultural, serological and biochemical properties it was determined as *Salmonella abortus-equi*.—B. Oswald (Križevci).

Wanner, A. (1937). Beiträge zur Breslauinfektion der Enten. [*Salmonella enteritidis* **Breslau Infection in Ducks**].—*Z. InfektKr. Haustiere.* **52.** 128-162. 6 tables. [Numerous refs.]

The report of an investigation originating from a case of paratyphoid in a young man who had eaten a duck egg. The infection was found to be *S.e.* Breslau. The ducks from the farm which had provided the egg were obtained for investigation. They did not show signs of serious clinical illness, but half of them were in a depressed state of health. All the ducks were submitted to nine blood agglutination tests at intervals of 10-17 days, using both stock antigens and the strain which was isolated from the sick man. Half of the ducks had a titre of less than 1 : 5 and only a few had a titre above 1 : 20. Although several repeated blood culture tests were made, using Müller's enrichment method, the results were always

negative. Consequently it was considered that the infective organism only reached the blood in an acute stage of infection. Culture tests were also made with faeces at intervals of 2-9 days, and *S.e.* Breslau was isolated once on an ordinary culture medium and 13 times by the use of the enrichment medium. In most cases the organism was only isolated once from the individual ducks. 376 eggs were also examined, and *S.e.* Breslau was isolated from 19—seven times from the shell, 5 times from the white, and twice from the yolk. All the infected eggs came from ducks which had given negative results to all the above tests. The ducks were all killed and examined. In 80% there was a catarrhal enteritis, in 60% ovarian disease, and in 33% changes in the liver. Twenty-eight samples of material from each duck were examined culturally and *S.e.* Breslau was recovered from 19 samples from various ducks.

W. concludes that it is impossible to detect infected ducks by bacteriological tests on living birds, and that in suspected cases birds ought to be killed and diagnosis made from the carcasses.—Sassenhoff (Munich).

Zdrodovskiĭ, P. F. [Editor]. (1937). Brucellez. Trudy Ekspedicii Viem po Izučeniju Ovečjego Brucelleza (1933-1936). [**Investigations of the VIEM Expedition for the Study of Brucellosis of Sheep (1933-1936)**]. pp. 455. Numerous figs., tables, graphs. [Numerous refs.] Moscow: Viem Publ. Dept. [4to] [12s. 6d.]

[VIEM are the initial letters of Vsesojuznogo Institute Eksperimentalnoj Medicini, which means in English, Pan-Soviet Institute of Experimental Medicine].

This book is a collection of the reports by the various scientific members of the Commission which was delegated in 1933 by the A. M. Gorky All-Union Institute of Experimental Medicine in Moscow to study the problem of brucellosis in sheep. There were fourteen scientists on the staff of the expedition. The work was carried out from 1933 to 1936 on an extensive Experimental Sheep Farm in North Caucasus under the scientific leadership of Z., who in an introductory paper gives a general review of the results obtained by himself and his collaborators in the investigations of the different phases and aspects of the disease, with particular reference to the possibility of reconstituting healthy sheep flocks from diseased stocks with the help of allergic tests with the special antigen, " brucellysate ", prepared by the Commission [see below].

Zdrodovskiĭ, P. (1937). Ekspedicija Vsesojuznovo Instituta Eksperimentalnoj Mediciny po izučeniu ovečiego brucelleza (1933-1936 gg.) [**Investigations on Brucellosis in Sheep from 1933 to 1936 in North Caucasus**].—*Brucellosis in Sheep*. pp. 9-18. Moscow: Viem Publ. Dept.

The flocks, chiefly of fine-fleeced varieties, covering a total of between 13,000 and 15,000 animals, were known to have been affected with the disease for several years. From the first observations the Commission realized that with the facilities available they could not undertake serological tests of all the animals on the farm. Preliminary experiments are said to have shown that allergic tests were reliable for the purpose of determining the presence or absence of brucella infection in the animals tested. It was soon found, however, that preparations used in western countries for these tests (*e.g.*, the English abortin and French brucellin and melitin, and the Italian anabortin) did not give entirely satisfactory results; this was chiefly because they did not always give specific reactions or because, owing to inadequate standardization, the reactions they caused were not strictly comparable; moreover, they had a sensitizing effect on healthy animals, precluding the possibility of subjecting the

same animal to a control test within a time limit useful for practical purposes. Such drawbacks are claimed to have been almost obviated with a soluble protein extract of *Brucella suis* [see p. 97.], which was prepared by the Commission, and which is referred to under the name " brucellysate ".

In 1935, allergic tests with this preparation were made on all the sheep on the farms, and the results showed that 20-74% of the animals in the different flocks were affected with brucellosis; in similar tests, 19% of the human personnel (who numbered 600) were reactors, while among the hands directly in charge of the flocks infection ranged between 25 and 73%.

Cultures from 833 aborted foetuses yielded *Brucella melitensis* in 53% of the cases, indicating that well over one half of the abortions were due to brucellosis. The investigation is further claimed to have established that, while ewes are highly susceptible to infection, direct contact of the animal with sufficiently rich infective material is required to determine active infection. It is stated that abortion occurred only when the ewes were infected during pregnancy, and not if they were infected before service.

Allergic tests with "brucellysate" are finally claimed to have allowed of segregating from the flocks, in 1935, about 6,000 ewes giving negative reactions at two or three tests at intervals of one or two months. In 1,200 yearlings which were inseminated artificially in 1936, there were only three abortions; cultures from the aborted material remained sterile.

Collateral experiments are stated to have established for the first time that pigs may be infected with *Br.m.* and to have confirmed the high susceptibility of the Siberian marmot to brucellosis; they are further claimed to have brought fresh evidence of the possibility of lizards and sheep ticks [species not indicated] being infected with the organism.

Štriter, V., Voskresenskiĭ, B., & Kotljarova, H. (1937). K bakteriologii brucelleza u ovec pri estestvennoj infekcii i pri eksperimentaljnom zaraženii. [**On the Bacteriology of Sheep Brucellosis under Natural and Experimental Conditions of Infection**].—*Brucellosis in Sheep.* pp. 23-35. 1 fig., 7 tables. Moscow: Viem Publ. Dept.

The authors speak of the dearth in the literature of data on the distribution of the causal organism in sheep affected with brucellosis. They examined bacteriologically (a) the carcasses of 105 sheep artificially infected with a virulent culture of *Br. melitensis* (101 by subcutaneous injection, chiefly into a hind leg, four sheep infected *per os*), (b) 23 ewes slaughtered at various periods after natural abortion, and (c) the aborted foetuses of the ewes. In sheep injected with small numbers of the organism (5,000-100,000), and slaughtered 15-30 days later, *Br.m.* was only recoverable from the group of lymph nodes nearest the site of injection (regional infection), while in those that had received large doses (1,000,000 bacteria and over), it was also recovered from lymph nodes far removed from the site of injection, and also from certain internal organs. In cases of generalized experimental infection and in the naturally aborting ewes, *Br.m.* may be grown most frequently from the spleen, and from certain groups of lymph nodes, especially the pharyngeal mediastinal, portal, mesenteric and supramammary. In the sheep infected *per os* the infection was localized to the submaxillary and cervical lymph nodes. Only rarely was it obtained from the kidneys, blood, urine, or the mesenteric lymph nodes. The liver and the remaining lymph nodes occupy an intermediate position in this respect. In ewes naturally aborting as a result of brucella infection, the organism could usually be grown from the organs and lymph nodes enumerated above 15-30 days after abortion, but in about 50% of

cases the results were irregular 45 days to three months after abortion ; in no case could it be recovered after 4-13 months. Even at the earliest dates *Br.m.* is not always present in the blood of the aborting ewes.

The authors state that sowings should be made from as many organs as possible, as otherwise the results may be misleading ; in view of the relative paucity of the bacilli in the organs, fairly abundant material should be used.

TARASOV, I., & VERSILOVA, P. (1937). Opyt massovogo bakteriologičeskogo issledovania abortirovannyh plodov pri ovečjem brucelleze. [**A Bacteriological Examination of the Aborted Foetus for the Presence of** *Brucella melitensis*].—*Brucellosis in Sheep*. pp. 37-44. 6 tables. Moscow : Viem Publ. Dept.

The authors give a detailed account of the technique they used for the bacteriological examination of 833 foetuses from 679 aborted ewes. Cultures of *Br.m.* were obtained from 50 % of the foetuses. Growths were obtained from the amniotic fluid in 35 % of cases, peritoneal liquid in 28·4 %, urine in 23·5 %, stomach contents in 23·2 %, lungs in 22·9 %, brain in 21 %, heart blood in 19·7 %, liver in 19·5 %, spleen in 19·2 %, kidneys in 18 %, and ovary in 6·2 %.

Out of 169 abortions of twin foetuses, *Br.m.* was obtained from only one of the twins in 37 cases (22 %), demonstrating the necessity of making sowings from both aborted twins to avoid misleading results. The bacteriological examination of 93 lambs, which died 1-30 days after birth, showed that 24 % were infected with *Br. melitensis*. Allergic tests with " brucellysate ", carried out on 106 three-month-old lambs from affected mothers, were positive in nearly 10 % of the cases, but were negative on 103 lambs of the same age, from unaffected ewes.

TARASOV, I. (1937). Materialy k klinike ovečjego brucelleza. [**On the Clinical Picture of Brucella Infection in Sheep**].—*Brucellosis in Sheep*. pp. 107-115. 3 tables, 3 graphs. [3 refs.] Moscow : Viem Publ. Dept.

Artificial infection of 22 ewes with a virulent strain of *Br. melitensis* (*via* the skin or mucous membranes) was not usually followed by marked clinical symptoms or significant temperature reactions. Four ewes, however, which had been given large doses of the organism (from 2×10^{10} to 4×10^{10}) *per os*, developed irregular fever, up to 41·4°C., during the first 45 days after infection, accompanied by general depression. Further observations on these ewes, and on 22 more which had aborted as a result of natural infection, showed that in all the animals abortion was preceded and followed by exactly the same symptoms and pathological conditions as described by DUBOIS in goats [(1912). *Rev. vét., Toulouse.* **19.** 173]. It is pointed out that the osteoarthritic, synovial, and nervous troubles observed in the ewes are very reminiscent of the same complications in affected human beings. The intensity and duration of the different symptoms varied in the ewes, but of the 44 observed, 43 " recovered " within 4-6 weeks after abortion.

ANON. (1937). Proyecto y reglamento para la lucha contra la enfermedad de Bang. [**Project of a Law for the Control of Bovine Brucellosis**].—*Bol. mens. Direcc. Ganad. Montevideo.* **21.** 274-283.

The subject is considered under several headings :– testing of imported stock ; certification of animals in shows, etc. showing that they are uninfected ; provision of government aid ; pasteurization or other treatment of milk from affected herds, and vaccination.

In " clean " herds, assistance will be given in cases of suspected reinfection, and in infected herds testing will be carried out and reactors eliminated or isolated.

Diagnostic tests will be carried out every five months until two successive tests prove negative, after which two further tests will be made at intervals of one year. Infected breeding animals will be isolated, and young stock will be weaned as soon as possible (4-6 months) and then isolated and tested when one year old and again five months later. On passing both tests they are transferred to clean herds. Other usual prophylactic measures will be adopted.

Out of 4,692 animals tested between 1932 and 1935 27% were reactors. Cases of human infection were also recorded.—A. H. HUNTER.

ROMAN, G. (1938). La vaccination effective du cobaye contre l'infection brucellique. (*Brucella melitensis*). Premiers résultats. [**Vaccination of Guinea Pigs against** *Br.m.*] pp. 68. 5 tables, 8 graphs. [19 refs.] Largentière (Ardèche): Imprimerie E. Mazel. [8vo].

R. describes the successful vaccination of g. pigs against *Br.m.* by the combined use of the glyco-lipid extract of Boivin and Mesrobeanu (*V. B.* **6.** 441.] and a living avirulent strain of *Br. abortus*. This strain of bovine origin, isolated in the Antilles, produces abundant H_2S and typical growth on Huddleson's dye media, but grows freely on Petragnani's medium. In large doses it causes transient formation of agglutinins in g. pigs, but after the third week it cannot be recovered in culture from the organs.

In the present experiments the g. pigs were divided into four groups; (1) received only the virulent test strain of *Br.m.*; (2) received glyco-lipid extract, and (3) received avirulent *Br.abortus*; groups (2) and (3) were subsequently inoculated with the virulent test strain. The fourth group received both the extract and the *abortus* strain, and were tested by infection with the virulent *melitensis* strain. This group was again divided into two sub-groups :– (a) eight g. pigs vaccinated three times at eight-day intervals with a mixture of extract and *abortus* suspension, each receiving a total amount of 1 c.c. of extract and 15×10^9 organisms, and (b) 11 g. pigs receiving 0·5 c.c. of extract intradermally and 0·5 c.c. of *abortus* suspension intradermally plus 0·5 c.c. subcutaneously. The test inoculations were made after six and four weeks respectively. The test strain was applied to the freshly scarified skin in a dose of about two million organisms. Periodical blood cultures and agglutination and intradermal tests were performed; the g. pigs were killed after 5½ months, the organs and lymph nodes cultured, and any increase in their size was noted. Inoculation with glyco-lipid extract alone was followed by some immunization, but protection was not constant. The *abortus* strain also produced only a slight degree of immunity, whereas the use of both was followed by complete immunity in 80% of cases. Experiments are being continued with cattle and sheep.—S. J. GILBERT.

BULL, L. B., & TURNER, A. W. (1937). **Investigations in Australia into some of the Problems of Infections by Anaerobic Micro-Organisms in Stock.**—*J. comp. Path.* **50.** 330-334. [Numerous refs.]

This is a résumé of the literature dealing with the following diseases :– " black disease ", enterotoxaemia of sheep, tetanus, blackleg, " big head " in rams, forage poisoning in horses and botulism in sheep.—P. S. WATTS.

ROBERTS, R. S. (1938). **Braxy-Like Diseases of Sheep. I. The Mechanism of Entero-Toxaemia with Particular Reference to** *Cl. welchii Type D.*—*Vet. Rec.* **50.** 591-604. 8 figs. on 2 plates, 10 tables, 4 graphs. [15 refs.]

R. describes a simple method by which sheep can be made to succumb to enterotoxaemia by ingestion of the causal organism.

The effect of secretions with which the organisms come in contact during passage through the alimentary tract was determined by a number of *in vitro* experiments. A sterilized cows' milk medium was used, and it was inoculated with a strain of *Cl.w.* Type D, obtained from a case of pulpy kidney disease. The first object was to determine the fate of the organism in the presence of free acid and milk. Incubation of organisms, acid, and milk together showed that viability was affected abruptly. Only 1% of organisms were viable at the free acid point. Viability appeared to be related to the amount of free acid present. The margin between acidity which did not kill the organism and that with near sterilizing effect was, however, very narrow. In milk with +50 units of free acid the effect on viability was exercised almost entirely within five minutes. The age of the culture was of no significance, nor did heat-resistant forms show special resistance.

The experiments suggested that the acid might be rendered innocuous by combination with casein. By adding casein in series to diluted milk, and incubating with acid and organisms, the effect on viability was found to be inversely proportional to the amount of casein present. The degree of acidity which inhibited proliferation was found by inoculating 10 c.c. of milk with 1 c.c. of 24-hour culture, in series. Slight retardation of growth occurred at –85 unit of free acid, and complete inhibition at –20 units.

The effects of pepsin, trypsin, and bile were investigated. Pepsin had no effect on the action of acid. Neither trypsin nor bile retarded the early growth of the organisms, and neither had any deleterious effect on toxin already formed.

By inoculating tubes of milk of pH 4·0 to pH 10·0 with 1 c.c. of 24-hour culture and incubating, it was found that a demonstrable amount of toxin was produced in 3½ hours within the limits pH 6·0 to pH 10·0.

A number of *in vivo* experiments were then undertaken. After a large milk feed, the abomasum contents of a lamb may remain at –100 units of acidity for three hours, but after a small feed acidity may rise to –35 units within two hours.

A lamb, hand-fed from birth, was given 600 c.c. of milk and the centrifuged bacterial growth from 120 c.c. of a 24-hour culture of *Cl.w.* Type D when seven days old. Samples were removed from the abomasum from time to time. The sample taken after three hours showed gas formation, and was toxic for mice. Characteristic symptoms appeared in the lamb in 3-4 hours, and death occurred in 5½ hours. A second lamb, two days older, died in 5¼ hours.

Two one-week-old lambs given 100 c.c. milk, the centrifuged bacteria of 120 c.c. of broth culture, and sufficient magnesium carbonate to neutralize the acid which would saturate the casein, remained normal. A four-week-old lamb given 1,600 c.c. milk with the same dose of culture died after ten hours.

R's conclusion is that, after the ingestion of a large feed, the casein renders the acid of the abomasum inert for a sufficient time to allow *Cl.w.* Type D to proliferate in the abomasum and produce toxin. Progressively increasing numbers of organisms pass out, and the chyme becomes progressively more toxic. Production of the toxin occurs in the small intestine, where further proliferation and toxin production are possible. Absorption follows in the usual way.—D. D. Ogilvie.

Prigge, R. (1937). Experimentelle Untersuchungen ueber die serologischen Eigenschaften des Fraenkelschen Gasbazillus (B. perfringens). II. Mitteilung. [**Experimental Observations on the Serological Properties of *Clostridium welchii***].—*Z. ImmunForsch.* **91.** 457-469. [11 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 238. Signed G. S. Wilson]. [See also *V. B.* **7.** 415].

In a previous paper the author brought evidence to show that filtrates of *Cl. welchii* cultures contain an alpha or haemolytic toxin and a zeta or lethal toxin. Further work has confirmed these conclusions. Filtrates were prepared from cultures of different colonial types of two strains, A 52P and A 15P. The haemolytic titre of each filtrate was tested, together with the lethal dose (dl_{100}) for mice inoculated intravenously. There appeared to be no constant relationship between these two titres. For example, in different filtrates the number of haemolytic doses corresponding to one lethal dose varied from 0·4 to 500. No relationship could be made out between the colonial form of an organism and the proportion of the two toxins to which it gave rise. Attempts were made to separate the toxins by precipitation with salts. The results obtained suggested that the zeta toxin could be thrown down to a considerable extent by saturation with sodium sulphate and the alpha toxin by subsequent saturation with ammonium sulphate.

Oxer, D. T., Adey, C. W., & Kennedy, May. (1936). **Alum-Toxoid as a Vaccine for the Prevention of Tetanus in Animals.**—*Aust. vet. J.* **12.** 221-225. 1 table. [17 refs.]

The experimental work recorded was undertaken to determine the local reaction following vaccination with alum-toxoid, the immunity response and the resistance to infection following vaccination. In 30 horses inoculated, the local reaction consisted of a large oedematous area which disappeared in four days, leaving a small swelling which took weeks or months to resolve completely. Single doses of alum-toxoid injected into 20 horses stimulated a high antitoxic response. When five of these animals and five controls were later injected with toxin-free tetanus spores and calcium chloride solution the vaccinated horses were unaffected, while three of the five controls developed tetanus and were destroyed.—T. S. G.

Drieux, H., & Basille, D. (1938). Deux observations d'actinomycose de la peau et des muscles de la région dorso-lombaire chez la vache. [**Actinomycosis of the Skin and Muscles of the Dorso-Lumbar Region in Cattle**].—*Rec. Méd. vet.* **114.** 221-225. 1 fig.

Two unusual cases of *Actinomyces* infection of the skin of the dorso-lumbar region and underlying muscles are described, an interesting feature being that the distribution of the lesions was practically the same in both cases. The adjacent lymph nodes were not involved. Infection is attributed to the use of mustard as a counter-irritant, the mustard being contaminated with " spores ". The diagnosis was made by microscopic examination of films and sections.

—Gwilym O. Davies.

Bareggi, G. (1938). Contributo allo studio dell'actinomycosi. Un caso di actinomycosi primaria delle vie respiratorie. [**Primary Actinomycoses of the Respiratory Organs in a Pig**].—*Clin. vet., Milano.* **16.** 84-90. 6 figs. on 2 plates, 1 table. [Numerous refs.]

The following lesions were found in a young sow at Paira abattoir :– miliary nodules throughout the mucous membrane of the respiratory system from the larynx inwards, and in the lung substance; plaques on the epicardium and nodules in the myocardium; swollen, haemorrhagic bronchial and mediastinal lymph nodes; a plaque in the serous coat of the stomach; enlarged mesenteric lymph nodes, and ulcers in the intestine. The other organs were not affected. The nodules and plaques were grey, with necrotic centres, and on microscopic examination were found to be actinomycotic in origin. G. pig transmission tests were negative. The pathogenesis is discussed.

DISEASES CAUSED BY PROTOZOAN PARASITES

Markov, A. A. (1937). Sovetskaja protozoologija v borjbe za ozdorovlenie socialističeckogo životnovodstva. [**Protozoan Diseases of Animals in U.S.S.R.**]—*Sovyet. Vet.* Nos. 11-12. pp. 37-41.

A short article in general terms on the protozoan diseases of livestock in Russia. Up to the present time 24 species of parasitic protozoa have been identified [not named by M.]. The chief control methods in use for piroplasmosis are dipping and pasture foliage clearance for tick destruction, and the destruction of rodent carriers of immature ticks.

Protozoicidal drugs have also been made and used to some extent—notably " naganin " [Soviet-made] against surra and, it is said, against dourine.

Yutuc, L. M. (1935). **Observations on the Occurrence of Surra in Laguna Province and Its Relation to the 1933 Outbreak among College of Agriculture Animals.**—*Philipp. Agric.* **24.** 104-110. 2 tables. [10 refs.]

Surra has a wide-spread distribution in the Philippine archipelago, being found in nearly every province. Infection is found principally among water-buffaloes, and to a lesser extent among the native cattle. It occurs either sporadically or epizootically, the latter when a large number of animals are congregated, as for example with army horses. It is not known when the disease was introduced. The majority of the cases recorded at the College were among horses. In general, the nature of the disease among water-buffaloes and cattle is that of a chronic, relapsing type with a tendency to recovery.—J. A. Griffiths.

Pellegrini, D. (1937). Tripanosi naturale del suino. [**Trypanosomiasis in Swine**].—*Nuova Vet.* **15.** 305-308. [See also *V. B.* **8.** 633].

P. records an outbreak of trypanosomiasis in a herd of Large White pigs imported into Italian Somaliland from Kenya. The symptoms were anorexia, staggering gait, marked anaemia and oscillating temperature. Blood examinations were constantly negative, except in one pig which was injected (subcut.) with 20 c.c. of sterilized milk to make the parasites come into the blood stream (said by P. to be a method used in diagnosing human malaria). In this animal trypanosomes appeared in the blood stream, and death occurred a few days later. Nothing noteworthy was seen P.M. Blood films stained with Giemsa revealed organisms morphologically similar to *Tryp. congolense* and *Tryp. simiae*. Attempts to infect young pigs with *Tryp. congolense* obtained from cattle yielded negative results. —J. A. Nicholson.

I. Cailleau, R. (1938). Le cholestérol et l'acide ascorbique, facteurs de croissance pour le flagellé tétramitidé *Trichomonas foetus* Riedmüller. [**Cholesterol and Ascorbic Acid as Growth Factors for** *Tr.f.*]—*C. R. Soc. Biol. Paris.* **127.** 861-863. [4 refs.]

II. Lwoff, M. (1938). L'hématine et l'acide ascorbique facteurs de croissance pour le flagellé *Schizotrypanum cruzi.* [**Haematin and Ascorbic Acid, Growth Factors for** *Trypanosoma cruzi*].—*C. R. Acad. Sci., Paris.* **206.** 540-542.

I. C. details and tabulates culture tests of *Tr f.* with broth media to which calf liver, g. pig liver, g. pig liver extracted with alcohol and acetone, cholesterol, living and killed *Bacterium shigae*, and ass's serum had been added singly and in various combinations as possible growth factors.

He concludes that cholesterol and ascorbic acid cannot be synthesized by *Tr.f.* and that they are necessary growth factors for this organism.

II. Hitherto whole blood in a concentration of about 20% has been added to most media for culture of *Tryp. cruzi* without the true growth factors being known. L. shows by culture tests of a basic peptone medium to which whole blood, serum, washed red blood cells, haematin and ascorbic acid were added in various combinations, that the serum, haematin and ascorbic acid were all necessary factors. The serum contains an unknown factor or factors designated TS, of which cholesterol may be a part, as has been proved in the case of the growth requirements of *Tr. columbae*.—C. V. Watkins.

Girard, H., & Flucher, R. (1937). Un nouveau moyen de diagnostic de la leishmaniose et de la piroplasmose canines: la ponction du sternum. **[Diagnosis of Leishmaniasis and Piroplasmosis in Dogs by Sternal Puncture].** —*Rev. Méd. vét., Toulouse.* **89.** 617-640. 3 figs., 2 plates. [Numerous refs.]

The greater part of this paper is devoted to a study of the normal cells of the blood, their origin and development, and their appearances in preparations from bone-marrow withdrawn from the living animal. A technique for puncture of the sternum of the dog is described in detail, the puncture being made at the anterior sternebra with a trocar and canula. Material is withdrawn by means of a syringe, and spread carefully on slides. These films are rapidly air dried and stained by May-Grünewald and Giemsa. In describing the formation of the blood cells and the different types of cells encountered in their evolution, the terminology of Ferrata is closely followed. The role of the bone-marrow, spleen, lymph nodes, etc., in the formation of the blood cells and modifications which occur in these functions are discussed. A description of each type of cell is given, with appropriate comments in each case.

A table shows the percentage of the different types of cells encountered in bone-marrow smears made from the sternal medulla of healthy dogs of various ages. All were found except basophile myeloblasts. Leishmaniasis in the dog is a generalized condition, and sternal puncture affords a simple method of examination, as also in suspected canine piroplasmosis. The study of variations in the medullary cells in leucaemia and anaemias can also be easily performed by this method and should prove a valuable aid to diagnosis.—S. J. Gilbert.

Legg, J. (1936). **Anaplasmosis. Cross-Immunity Tests between Anaplasma Centrale (South Africa) and Anaplasma Marginale (Australia).**—*Aust. vet. J.* **12.** 230-233. 1 table. [3 refs.]

Since the discovery during the last few years that *A.m.* is widely distributed throughout the tick-infested areas of North Australia, the problem of finding a method of vaccinating against this organism is an important one. As the evidence regarding the value of protective inoculation with *A.c.* was conflicting, L. has conducted laboratory and field trials, using as infecting material the blood of carriers of *A.c.* obtained from South Africa. His results show that Australian cattle react fairly severely to inoculation with *A.c.*, but recover rapidly, and afterwards generally possess a high resistance to infection with *A.m.*

Cattle about to be transferred from clean to tick-infested country in Queensland are now premunized by inoculating them with *B.b.* and *A. centrale.* No untoward effects have followed the transfer of these cattle to tick-infested pastures.

The Australian cattle tick (*Boophilus australis*) transmits *B. bovis* and *B. argentina* as well as *A.c.* It has been found that *B. bovis* inoculation confers a high resistance to *B. argentina*.—T. S. Gregory.

I. Marčenko, G. F. (1937). Kokcidiozy domašnih zivotnyh na severnom Kavkaze. [**Coccidiosis among Domestic Animals in North Caucasia**].—*Sborn. Rab. Leningrad. vet. Inst. 1937.* pp. 155-159. 1 table. [10 refs.] [German summary].

II. Jakimov, V. L. [Yakimoff, W. L.], & Mačuljskiĭ, S. N. (1937). Kokcidioz sobak v Leningrade. [**Canine Coccidiosis in Leningrad**].—*Ibid.* pp. 163-167. 5 tables. [17 refs.] [German summary].

I. M. examined horses, cattle, sheep, pigs and rabbits in North Caucasia, and gives an account of the various coccidia he found in these animals.

Out of 165 horses examined, 24 were infested ; the coccidia found are to be described in a later work. Out of 137 cattle examined, coccidia were found in 65, 54% of cases being due to *Eimeria smithi*, 20% to *E. zurni*, 16% to *E. ellipsoidalis*, one case to *E. bukidnonensis*, and the remaining 19·3% to mixed infection. All of the 60 sheep examined were infected with *E. arloigni*, *E. ninae Koli-Jakimov*, and *E. galousi* ; *E. parva* was found in three sheep. Thirty of the 85 swine examined were found to be infected, 50% with *E. debliecki*, 20% with *E. spinosa*, 7% with *E. scabra*, and 23% with two or three of these species simultaneously. Among a " very great number " of the rabbits examined, infection with *E. stiedae*, *E. perforans*, *E. magna* and *E. exigua* was common ; infection with *E. media* and *E. irresidua* was also suspected.

A table gives the number and size of the more important coccidia found.

II. Of 206 dogs examined for coccidia in Leningrad, 35 were found to be infected, those well cared for being the least affected. The following coccidia were found and are described :– *Isospora rivolta* in 29 dogs, *E. canis* in five and *E. cati* in one. The size and distribution of the coccidia and their relation to the age and sex of the dogs are shown in tabular form.

DISEASES CAUSED BY VIRUSES

Laidlaw P. P. (1938). **Virus Diseases and Viruses.** pp. 52. London : Cambridge University Press. [8vo] [2s. 6d.]

In the Rede lecture for 1938 L. gave a wide review of the present knowledge on filtrable viruses of the animal and vegetable kingdoms, and discussed the theories on the nature of viruses—whether they are live micro-organisms or protein molecules. A table of virus particle sizes is included.—J. E.

I. —. (1938). **Discussion on Recent Work on Heavy Proteins in Virus Infection and its Bearing on the Nature of Viruses.** [Speakers : Henderson Smith, J., Andrewes, C. H., Bawden, F. C., Bernal, J. D., & McFarlane, A. S.] —*Proc. R. Soc. Med.* **31.** 199-210. [5 refs.]

II. Gortner, R. A. (1938). **Viruses—Living or Non-Living ?**—*Science.* **87.** 529-530. [3 refs.]

I. Henderson Smith, who opened the discussion, summarized the evidence favouring the view that the purified proteins, which have been isolated from infected plants, are the actual causal agents. The crystalline material obtained from the sap of diseased plants is infective in concentrations of the order of one hundred-millionth of a gramme per c.c., and is transmissible indefinitely in series. It has all the properties of the virus from the naturally infected plant with the sole exception of filtrability, which is lost as soon as the protein material is precipitated. This is attributed to an aggregation or polymerization of the particles.

ANDREWES discussed the possibility that some of the animal viruses might be of the nature of heavy proteins, and quoted experiments on the viruses of rabbit papilloma, equine encephalomyelitis, and vaccinia which seemed to support this view. He thought that the evidence in favour of the identity of the crystalline substance and a virus in the plant world was gradually increasing, but the problem as to whether they were micro-organisms or autocatalysts had not yet been solved.

" I shall not discuss whether these viruses are alive or dead, because I think it obvious that according to the criteria we have held in the past they possess some of the properties hitherto associated with autonomous living things and some hitherto associated with non-living chemical substances. But I should *not* conclude from that that they are in process of evolution from the non-living to the living. I find it far easier to think of them as small micro-organisms which in the course of evolution have gained by becoming smaller, losing some of the chemical complexities of larger beings, and perhaps thereby becoming subject to physico-chemical laws which may on occasion cause them to do such things as form paracrystals. I know that viruses are of a graded series of sizes, larger in some instances than cultivable organisms, that their immunological behaviour is like that of bacteria in that an animal once infected becomes more or less immune to subsequent infection, that some of them can form soluble haptenes, or multiply in an insect intermediate host, that they can mutate and adapt themselves to altered conditions. If I am asked to forget all that and adopt a new philosophy of life because the bodies in question can arrange themselves in orderly rows, I entirely refuse to do so."

BAWDEN said certain workers held that purified plant virus preparations consisted largely of inert proteins contaminated with small amounts of active virus, but he considered that this was improbable. The characteristic proteins had been found in enormous amounts in infected plants and never in those which were healthy, while the physico-chemical nature of the particular proteins isolated depended on the infecting virus and not on the host plant. These highly purified preparations were nucleoproteins and so acted as specific antigens giving visible precipitates with antiserum.

Five tobacco and cucumber viruses had been investigated. Each caused a characteristic disease, but all were serologically related, and their nucleoproteins possessed similar physico-chemical and serological properties. On the other hand, a highly purified nucleoprotein isolated from potato virus " X " differed from the preceding, since it did not give rise to paracrystalline needles, but to a flocculent amorphous precipitate.

He suggested that some of the smaller and more stable animal viruses had properties in common with these plant viruses. He pointed out that certain lines of treatment which denatured the protein caused a loss in infectivity of plant viruses without affecting the serological reactions. These results were of no practical value in plant viruses, but he thought they might be usefully applied to animal viruses for the preparation of vaccines.

BERNAL said that certain physical properties, coupled with X-ray examinations, had clarified the structure of the paracrystalline preparations, but gave no direct evidence as to whether the aggregates represented pure virus particles. He advanced the theory that the particles were really microtactoids. An X-ray examination showed that they were indistinguishable from " wet gel " containing about 50% of water, formed by drying the concentrated solution.

MCFARLANE considered that the structure of these particles, as revealed by crystallographic measurements and other means, casts some doubt on the usual arguments for regarding the smaller viruses as living organisms.

H. G. reviews the modern attitude to the nature of viruses, maintaining that it has still to be proved that they are " non-living " particles. He points out, in regard to living cells, that even when the greater part of the cytoplasm has been dissected away from the nucleus, the latter is capable of regeneration. He suggests

that one might conceive viruses as living organisms, the cell nucleus of which has lost its capacity for cytoplasmic formation and has retained only the functions of elaborating nuclear material (chromatin), and of reproduction.

This concept would cover STANLEY's " nucleoproteins " obtained from plants. The crystalline nature of the latter does not rule out the possibility that they are living, since many unicellular organisms can arrange themselves in clusters: moreover, naked nuclei might form specific groupings, resembling crystals, under the influence of electrical phenomena.—R. E. GLOVER.

I. LECLAINCHE, E. (1938). L'épizootie actuelle de fièvre aphteuse d'avril 1937 à mars 1938. [**Foot and Mouth Disease in Europe from April, 1937 to March, 1938**].—*Bull. Off. internat. Epiz.* **16.** 17-46. 5 tables. 13 maps. Discussion pp. 307-370.

II. FLÜCKIGER. (1938). Indications respectives de l'abatage et de l'immunisation dans la fièvre aphteuse. [**The Comparative Value of Slaughter and Immunization in F. & M. Disease**].—*Ibid.* 47-61. 1 map. [5 refs.] Discussion pp. 307-370.

I. L. analyses the circumstances which led to the change from a most favourable state in Europe at the commencement of 1937, when F. & M. disease was everywhere on the decline, to the serious position which arose during the succeeding 12 months. The text deals with the disease as it affected the continent of Europe, and does not refer to the incidence in the United Kingdom.

The origin of the recent epizootic appears to have been the importation in April of sheep and pigs from Morocco and Algeria, where several localized outbreaks had occurred. Commencing in the neighbourhood of Marseilles, the disease quickly extended through the centre of France and by the middle of August had affected practically the whole of the country. In spite of every precautionary measure which seemed feasible, it proved impossible to prevent extensions to Belgium, Germany, Holland and other countries.

The outbreak was due to an " O " type virus. It is thought that it originated in North Africa as a relatively benign strain, but was transformed in Europe into a highly active virus. Owing to the impossibility of obtaining sufficient amounts of hyperimmune serum, all affected countries resorted, in the first case, to haemotherapy. This method was not adequate in preventing the spread of the disease, but was of considerable value in protecting young animals from the severe type of infection.

II. F. explains that, when the outbreak extended through France, rigorous regulations were imposed along the Swiss frontiers. A few isolated outbreaks occurred, but they were arrested by the usual slaughter policy coupled with the use of immune serum. The only Canton in which the disease was extensive was that of Geneva, which is almost surrounded by French territory. Here, it proved necessary to abandon the slaughter policy, and as a result 22 separate outbreaks occurred.

F. lays special stress upon the danger of " carriers " as initiators of fresh outbreaks in countries where the slaughter policy is not adopted.

In the discussion which followed several speakers gave estimates of the enormous financial losses which had been sustained in Europe through the outbreak, the severity of which had necessitated the introduction of special measures in each country. BOES and WILLEMS said that in Belgium the ordinary methods of control proved totally inadequate, and that it was necessary to resort to the protection of cattle by the inoculation of formolized blood obtained from acutely infected animals. The results were partially favourable, although they were inconclusive.

FRENKEL explained that in Holland a culture virus had been tried with some success [see p. 84]. CABOT remarked that in Great Britain the present outbreak was of interest because it had provided significant information on the initiation and spread of the disease by migrating birds. VORACEK said that in Czechoslovakia ordinary methods of control broke down and serum inoculation was employed with varying success. In Poland, on the other hand, according to MARCZEWSKI, the disease did not gain such a strong hold, and in general the stamping out method had been fairly successful. Similarly, PETERSEN reported that in Denmark a threatening position had been cut short by the slaughter method. BISANTI, on behalf of Italy, claimed that thanks to rigorous police measures, his country had escaped a severe outbreak. The disease existed in certain localities where it was fought mainly by immune serum. MAGNUSSON explained that geographically Sweden was in a similar position to Great Britain. Since 1933 no case of F. & M. disease had occurred. At the present time powers had been obtained to indemnify owners for any animal slaughtered from F. & M. disease. He also cited the main provisions of a special treaty which had been effected with Denmark to ensure mutual cooperation in the control of the disease [*V. B.* **8.** 699]. MÜSSEMEIER described the position in Germany where, prior to the current outbreak, the disease was almost under control. The present infection was so severe that, in addition to passive immunization, it became necessary to resort to active immunization by WALDMANN'S method [*V. B.* **9.** 17., and below]. Details were given of the manner of applying vaccine and the favourable results which had been obtained. [Since the publication of these articles, severe outbreaks of F. & M. disease have occurred in many of the countries which at that time were relatively free, *e.g.*, Sweden, Denmark, Poland, etc.]—R. E. GLOVER.

I. STRODTHOFF. (1938). Die aktive Immunisierung des Rindes gegen Maul- und Klauenseuche mit Riemser MKS.-Vakzine nach Waldmann und Köbe in der Praxis. [**Active Immunization of Cattle against Foot and Mouth Disease by the Riems Vaccine of Waldmann and Köbe**].—*Berl. tierärztl. Wschr.* June 17th. 349-357. 4 tables, 9 charts. [1 ref.] [See also *V. B.* **9.** 17].

II. MAAS. (1938). Die aktive Immunisierung gegen Maul- und Klauenseuche mit Riemser MKS.-Vakzine nach Waldmann und Köbe. [**Active Immunization against F. & M. Disease with the Riems Vaccine of Waldmann and Köbe**].—*Berl. Münch. tierärztl. Wschr.* Aug. 12th. 477-487. 4 tables, 1 chart. [2 refs.]

I. The Riems vaccine was used on cattle in non-infected districts which lay on the path of an outbreak and on cattle in districts already infected in Silesia north of Breslau, in March, 1938.

The object of the first trial was to verify the harmlessness of the vaccine to healthy cattle and to study immunity conferred by it. 9,582 cattle in 33 villages were vaccinated, and in three villages F. & M. disease occurred in six animals within 14 days, the period required for the development of full immunity; infection was evidently brought in from an infected area. No outbreak occurred in herds of vaccinated cattle after the period of 14 days. The vaccine was tolerated very well by the animals and there were no complaints from the farmers.

In the second trial 31,094 cattle in 2,784 herds in one area were vaccinated, and observations were made on the course of the outbreak. Results are given in a number of diagrams, for the appreciation of which the original must be seen. In general it was found that if the herd became infected within the first 12 days after vaccination, about half the vaccinated cattle contracted the disease, but if

infection arrived later no case of F. & M. disease occurred. When the vaccination could be done five or more days before the arrival of infection the course of the disease in the cattle contracting it was very mild.

Full details of the vaccination campaign are given.

II. M. gives the results of the vaccination in April, 1938, of 15,170 cattle, 1,649 sheep and 322 goats in the Soldin district, where the disease had appeared four weeks previously. The vaccine was given to confined animals irrespective of their state of health, and in no case was any ill-effect noticed, nor could any case of accidental infection be referred to its use. F. & M. disease occurred within 12 days of vaccination on 22 out of 1,400 farms, but was considered to be due to natural infection and not to the vaccine. 244 out of 669 vaccinated cattle on the 22 farms contracted the disease. On eight farms on which the cattle had been immunized, sheep became affected, but none of the cattle. From experience in one small herd it appeared that the immunity conferred by vaccine was still present 13 weeks after vaccination.

Vaccination was successfully carried out on cattle at grass on four farms.

With regard to the general result of the vaccination, it was observed that the disease eventually broke out in only 30 farms in the district where it had been applied, whereas in two adjacent districts the number of infected farms rose to over 400 and 200 respectively.

M. considers that a wave of infection can be halted by the proper application of vaccine.—J. E.

I. Toussieng, E., Fogedby, E. F., Frenkel, H. S., & van Waveren, G. (1938). Immunisation active des porcs et des bovins contre la fièvre aphteuse par le virus de culture adsorbé et à l'état pur. [**Active Immunization of Swine and Cattle against Foot and Mouth Disease with Adsorbed and Unadsorbed Culture Virus**].—*Bull. Off. internat. Epiz.* **16.** 205-216. 4 tables. [8 refs.]

II. Frenkel, H. S., & van Waveren, G. M. (1938). Essais d'immunisation avec le virus aphteux cultivé sur des explantations de la peau embryonnaire bovine. [**Immunization against F. & M. Disease with Virus grown on Bovine Embryonic Skin**].—*Ibid.* 217-225. [1 ref.]

III. Lavrovsky, N. E. (1938). Essais d'immunisation active des bovidés contre la fièvre aphteuse par le vaccin chloroformé. [**Active Immunization of Bovines against F. & M. Disease with Chloroform Vaccine**].—*Ibid.* 226-243. 2 tables.

I. Vaccines were prepared from a type "A" virus cultivated on bovine embryonic tissue for 150 serial passages. They were either untreated culture virus or the same material adsorbed on aluminium hydroxide, and were injected by the subcutaneous route.

Unadsorbed virus sometimes induced clinical F. & M. disease, but the danger could be minimized by sterilizing the needle track in order to prevent infection of the skin. In the case of mixtures, preliminary tests in the g. pig showed that the supernatant fluid from the adsorbed virus was incapable of setting up infection. The vaccines were tested on pigs and cattle, two successive doses being given at six days' interval.

When the inoculum was mixed in a proportion of 2 c.c. of virus to 18 c.c. of $Al(OH)_3$ it bestowed no appreciable protection on pigs vaccinated twice and subsequently exposed to natural infection, while when it was mixed in equal proportions, only two out of 15 treated animals resisted contact infection.

In the case of cattle more satisfactory results were obtained. Animals were vaccinated with pure virus, adsorbed virus or a combination of both, without visible effect beyond a rise in temperature : 14 protected animals were tested and 13 were immune to contact infection, although a proportion reacted when inoculated intralingually.

A highly virulent " O " strain behaved in a different manner, however, since adsorption to $Al(OH)_3$ was incomplete and the inoculated cattle showed F. & M. lesions due to the vaccine itself.

II. A type " A " strain cultivated on embryonic bovine skin was used under field conditions. In one herd, culture virus was given intralingually together with a dose of hyperimmune serum. After 24 hours all the animals showed a primary vesicle and later mild lesions developed on the feet. There was no severe systemic disturbance and, provided the feet were treated early with 10% iodine, no secondary complications occurred. In a second group, which received virus only, the reactions were more severe.

III. The authors report the results of field trials with a chloroform vaccine prepared according to the method of Galéa [*V. B.* **3.** 79]. A preliminary experiment showed that nine animals vaccinated twice intradermally with two doses were completely immune to contact infection, and six out of nine were also resistant to an intralingual injection.

In the field the results were less striking, the vaccine merely delaying the onset of lesions, while in calves practically no protection could be detected. Better results were obtained by a combined subcutaneous and intradermal method, although the resistance against natural infection was not always complete.

Further experiments were undertaken with a chloroform vaccine prepared locally with material from natural outbreaks. Complete immunity in all vaccinated animals was not attained, but the proportion affected, as compared with controls, was appreciably diminished.

It is stated that the antigenic value of the vaccine was increased by reducing the period of contact with chloroform from 10 to 7 days. The immunity commenced to decline at about the 43rd day.—R. E. Glover.

Stazzi, P. (1938). Dell'afta epizootica e della sua difesa. [**Control of Foot and Mouth Disease**].—*Clin. vet., Milano.* **61.** 37-41.

The recent severe outbreak of F. & M. disease reached Europe from North Africa, and appeared in Italy as a panzootic where it was controlled by embargo on movement etc. and also by the use in certain cases of a polyvalent hyperimmune serum, which proved of some value. This was prepared by inoculating cattle recently recovered from an attack of F. & M. disease with the A and O types of virus passaged in g. pigs as these were the types that predominated in the outbreak.

Details are given of the doses used and comments are made on the duration of the immunity conferred.—J. A. Nicholson.

I. Daubney, R. (1937). **Rinderpest : A Résumé of a Recent Progress in East Africa.**—*J. comp. Path.* **50.** 405-409. [9 refs.]

II. Bennett, S. C. J., & Evans, J. T. R. (1938). **Influence of the Dose of Virus Employed in Testing the Immunity of Cattle Vaccinated against Cattle Plague.**—*Ibid.* **51.** 1-8. 1 table. [3 refs.]

III. D'Costa, R. S. J. (1938). **Rinderpest—Methods of Immunisation.**—*Indian vet. J.* **14.** 331-340.

IV. Jacotot, H. (1938). Sur l'emploi des pulpes organiques avirulentes dans la préparation des boeufs fournisseurs de sérum contre la peste bovine. **[Use of Avirulent Organ Pulp for Bulls Producing Rinderpest Serum].**—*Bull. Soc. Path. exot.* **31.** 259-263. [3 refs.]

I. This paper summarizes briefly previous papers by D. on the use of vaccines in the control of rinderpest. In Kenya a comparison has been made of Indian goat virus, Kabete bovine virus and an attenuated goat virus produced at Kabete. Indian goat virus gave 85% reactors and 18% mortality in 100 cattle inoculated with this virus alone. Out of 100 cattle inoculated with 1 g. of tissue vaccine, and then 14 days later with 2 c.c. of a 2% suspension of goat virus (spleen tissue), 85 reacted. There were no deaths, and these animals resisted inoculation two months later with 2 c.c. of fully virulent 10% bovine spleen suspension, again with no deaths. Stock Kabete bovine strain virus gradually became attenuated from the 85th to the 150th passage through goats. The last symptom to disappear was diarrhoea. The possibility, therefore, of producing variants of rinderpest virus by serial passage in tissue culture seems highly probable. In two series of observations at Kabete the virus was carried through 3, 4 and 5 passages in bovine, caprine, and rabbit tissues. There appears to be some hope of producing in this way a cheap form of vaccine for the eradication of rinderpest. The virus of rinderpest does not appear to be pantropic and all attempts to produce a neurotropic variant have failed.

II. To prevent losses from rinderpest among cattle collected for seasonal use as serum producers, they are vaccinated with 1 g. per 100 kg. live weight of glycerinized vaccine (prepared from lymph nodes, spleen, thymus and tonsils). An experiment carried out to test the comparative effect of 1 c.c. of virus and 500 c.c. of virus given 3, 6, 9 and 12 months after vaccination showed no definite difference, all vaccinated animals being resistant. In the laboratory experiment 71·35% of the controls died of rinderpest. In a field test with 69 cattle intended for serum production, which had been vaccinated 20-27 weeks earlier, 60 gave normal reactions when given a hyperimmunizing dose of virus (1·5 c.c. per 1 lb. body weight). Eight animals became infected with rinderpest and of these three died; one animal gave an uncertain reaction. The authors in their summary state that " cattle plague serum producers may be hyperimmunized after simple vaccination ".

III. This paper details the methods which have been used in India for immunizing animals against rinderpest. The author considers the serum-simultaneous method the most satisfactory means of dealing with the disease. It is of interest to note that goat virus alone is said to cause 70% mortality in " hill bulls " [see I, above]. According to the author goat virus can be used alone for immunization only on cattle which have a high degree of resistance to rinderpest; when highly susceptible cattle are immunized, anti-rinderpest serum must be used with goat virus. Unsatisfactory results are also attributed to the " goat virus " often being avirulent.

IV. As the result of a small number of experiments, J. concludes that it is possible to produce anti-rinderpest serum from cattle that have been immunized by the use of large doses of avirulent vaccine. Two animals received two doses of 50 c.c. of vaccine, and then one of 100 c.c., at intervals of 15 days, and one animal received two doses, each of 20 c.c., at 15 days' interval; serum from these animals prepared after 15 days and used for sero-infection of susceptible cattle protected them against rinderpest. There was only a thermal reaction with slight clinical symptoms; serum from the same source used after four months' storage protected calves in doses of 60 c.c.—J. A. Griffiths.

Zenkner, J., Kołodziejska, Helena, & Jastrzebski, D. (1938). Niedokrwistość zakaźna koni. [**Equine Infectious Anaemia**].—*Wojsk. Przegl. weteryn.* **9.** 5-61. 6 figs., 1 chart. [Numerous refs.] [French summary].

Most of this article consists of a review of the literature. The authors give an account of an outbreak of E.I.A. among a large number of horses used in forestry work ; 25 died of the acute form of the disease. Transmission experiments were carried out on four healthy horses. Two were injected subcutaneously with filtered infected blood, and both survived, one developing chronic E.I.A. and the other a latent infection. Another horse inoculated (subcut.) with unfiltered blood died of acute infection, and the fourth horse, inoculated (subcut.) with the mouth parts of 80 *Stomoxys calcitrans* which had been collected while feeding on a naturally affected horse, also died of acute infection within three weeks.

I. Steck, W. (1937). Studien über die infektiöse Anämie der Pferde. I. Statistik der Schadensfälle im Kanton Bern. [**Equine Infectious Anaemia. I. In Berne Canton**].—*Schweiz. Arch. Tierheilk.* **79.** 368-383.

II. Mrowka, F. (1937). Ein weiterer Beitrag zur Pathogenese der infektiösen Anämie des Pferdes. V. Mitteilung. [**Pathogenesis of E.I.A. Part V**]. —*Arch wiss. prakt. Tierheilk.* **71.** 364-382. 10 figs. [11 refs.] [See also, *V. B.* **6.** 654].

I. A systematic report on E.I.A. between 1932 and 1936. 353 cases were diagnosed, of which 292 were sporadic. Diagnosis was based on clinical examination and little reliance could be placed on laboratory tests. Cases were more frequent in damp and badly drained areas than elsewhere.

II. M. carried out microscopic blood and tissue examinations on 12 cases of E.I.A. using special staining methods, chiefly scarlet red. Red corpuscles of horses with acute E.I.A. showed changes in shape ; and triangular or quadrilateral crystal inclusions such as M. observed in cases of renguera in sheep in Peru. Sections of diaphragms stained by Gram's method also showed fatty infiltration with Gram-positive inclusions. The above were not observed in chronic cases. M. believes that the Gram-positive inclusion bodies are micro-organisms which can be present in healthy animals, but may on occasion multiply and cause a mechanical muscular disturbance. He considers that heart lesions found in acute cases of E.I.A. are an example of this. For details of the staining technique and the nature of the crystal and fatty bodies described, the original should be consulted.

—F. Freudenberg (Hamburg).

Alexander, R. A. (1936). **The Horsesickness Problem in South Africa.**—*J. S. Afr. vet. med. Ass.* **7.** 211-220. [19 refs.]

This article is a review of the work carried out on immunization methods against horse-sickness. The question of the insect vector and the possible reservoir of the disease has not yet been determined. The first method of producing an active immunity was the use of serum-virus. It was too cumbersome in practice, too expensive, and did not give an adequate immunity against the multiplicity of strains in the field. The formolized virus method subsequently tried was a failure in practice. The present method, using neurotropic virus attenuated by passage through the mouse brain, has given excellent results in the field. It was possible to include a variety of strains in the vaccine, a durable immunity is produced, there is no mortality, and there are no unpleasant sequelae as a result of the inoculation itself.—E. M. Robinson.

Rubino, M. C., & Espantoso, K. (1937). Informe sobre una enfermedad de los lanares. El " Ectima contagioso ". [**Contagious Ecthyma in Sheep**].—*Bol. mens. Direcc. Ganad. Montevideo.* **21.** 378-387. 5 figs.

In the outbreak reported, lambs were chiefly affected, but older sheep were not immune. Foot and mouth disease had run through the flock about two months previously. The disease was set up in experimental animals with filtered material. Prickly plants seem to have played an important part in preparing the path for infection.—A. H. Hunter.

Neitz, W. O. (1937). **The Transmission of Heartwater to and from Blesbuck (*Damaliscus albifrons*) by means of the Bont-Tick (*Amblyomma hebraeum*).**—*Onderstepoort J. vet. Sci.* **9.** 37-46. 3 figs., 4 tables. [4 refs.]

Experiments are described in which it was possible to transmit heartwater to two blesbuck by infesting them with *A.h.* ticks known to be infected. Clean larvae and nymphs were able to acquire infection when feeding on one of the blesbuck. By subinoculating blood from the blesbuck into susceptible sheep, the heartwater " virus " could be demonstrated for a period of 35 days in one and for nine days in the other blesbuck. These experiments tend to show that under natural conditions heartwater can be maintained in ticks in the absence of domestic ruminants.

Jacotot, H., & Le Roux, G. (1938). Transmission de la rage au paon (*Pavo muticus L.*). [**Transmission of Rabies to the Peacock**].—*C. R. Soc. Biol. Paris.* **127.** 18-19. [1 ref.]

Intracerebral inoculation of three peacocks with strains of rabies street virus caused paralysis, with or without preliminary excitement, after an incubation period longer than that in rabbits and g. pigs.—R. O. Muir.

Webster, L. T. (1938). **Experiments on Antirabic Vaccination with Tissue Culture Virus.**—*Amer. J. Publ. Hlth.* **28.** 44-46.

The evidence that dogs can be immunized successfully with a single dose of culture virus is set out in as much detail as the present state of the work allows. Experiments have shown that, so far, no commercial vaccine can set up immunity, and an attempt is being made to prepare a vaccine which is effective and also free from brain-tissue.

" The technic of propagation is carried out in the following manner. Using aseptic technic throughout, 50 c.c. Erlenmeyer flasks are prepared with 4 c.c. of Tyrode solution containing 10 per cent. normal monkey serum plus 0·02 c.c. of a suspension of minced mouse embryo brain. This flask culture medium is then inoculated with 1 c.c. of a 1 to 100 dilution of the brain of a mouse prostrate on the 7th or 8th day following an intracerebral injection of rabies virus. At 3 to 4 day intervals, the contents of the flask is withdrawn to a centrifuge tube, allowed to settle, and 2·5 c.c. of the relatively clear supernatant is transferred to a second culture flask. This passage technic is repeated routinely and the virulence of the culture virus is titrated by inoculating the material intracerebrally in tenfold dilutions in Swiss mice."—D. D. Ogilvie.

Pinder, G. D. (1938). **Canine Distemper.**—*Canad. J. comp. Med.* **2.** 13-17.

P. discusses distemper from a clinician's point of view. He stresses some predisposing causes, such as anaphylaxis, parasites and malnutrition, and outlines therapeutic measures.—Chas. A. Mitchell.

Broadhurst, Jean, MacLean, M. E., Saurino, V., & Slawson, A. (1938). **Nasal Inclusion Bodies in Dog Distemper.**—*Cornell Vet.* **28.** 9-14. 10 figs. on 1 plate. [13 refs.]

The authors describe the presence of inclusion bodies comparable to the Negri bodies of rabies in the cells of the nasal mucosa of dogs with distemper. They were not detected with ordinary stains, but were readily demonstrated by treating heat-fixed preparations with a watery solution of nigrosin for 15-20 minutes. They ranged from 0·5μ to 2μ in diameter, and were usually situated in the cytoplasm.

These bodies were abundant in the acute stages of distemper, but became infrequent during the period of convalescence: nevertheless, they were still detectable in certain instances for several months after recovery. The significance of these bodies in the diagnosis of dog distemper is discussed.—R. E. Glover.

Pentimalli, F. (1936). Nature chimique de l'agent du sarcome du poulet. **[Chemical Nature of Fowl Sarcoma Virus].**—*Acta Intern. Ver. Krebsbek.* **1.** 54-63.

The infective agent of fowl sarcoma is present in the tumour tissue in rich concentration. When examined spectrographically in ultra-violet light it showed an absorbtion band with a maximum of 2,800 Å. It is therefore thought that the infective agent is a protein which contains a phosphorus group.

—Sassenhoff (Munich).

van Rooyen, C. E., & Rhodes, A. J. (1937). **Centrifugation of the Elementary Bodies of Infectious Myxomatosis of the Rabbit.**—*Zlb. Bakt. I.* (*Orig.*). **140.** 117-120. 3 tables. [2 refs.] [In English].

Infective rabbit testes were ground up and inoculated into the scarified corneas and conjunctivas of each of three rabbits. These sites were repeatedly washed out with sterile saline until the death of the rabbits. Part of the suspensions so obtained were centrifuged at 15,000 r.p.m. for two hours; the deposits were resuspended in saline. Elementary bodies were shown microscopically to be present in large numbers in the deposit, and absent from the supernatant. Uncentrifuged washings were kept as control material.

It was shown by intradermal inoculation into rabbits that the resuspended deposit and the uncentrifuged washings, when diluted to 1:1,000–1:10,000 caused typical papules, resulting in the death of rabbits. No papules were caused by the supernatant fluid when used undiluted. The authors concluded that the elementary bodies are the infective agent of infectious myxomatosis.—L. E. H.

Kasahara, S., Dei, K., Uyeda, M., Okamoto, Y., Hamano, R., Yamada, R., & Tsubaki, S. (1938). **On a Filtrable Virus Isolated from Rabbits.**—*Kitasato Arch.* **15.** 31-39. 2 figs. on 1 plate, 2 tables, 3 charts. [8 refs.] [In English].

The authors isolated 5 strains of a new filtrable virus (passed through a Berkefeld V filter) during passages through rabbit testicles of filtrates from human cases of influenza, typhus fever and measles. They call it " rabbit virus " and found that it was immunologically similar to variola-vaccinia virus, but further work is necessary before its identity can be determined.—R. Fisher.

Coles, J. D. W. A. (1936). **A Rickettsia-Like Organism of the Conjunctival Epithelium of Cattle.**—*J. S. Afr. vet. med. Ass.* **7.** 221-225. 8 figs. [7 refs.]

An organism of the rickettsia type, seen in smears of conjunctival scrapings from cases of ophthalmia in cattle is described. It is minute, pleomorphic, intracellular Gram-negative and non-acid-fast. The name *Rickettsia conjunctivae bovis* is provisionally suggested. The parasites are often difficult to find. The vector

has not been determined, but the organism can be transmitted directly from eye to eye without the development of any discernible symptoms.—E. M. Robinson.

Gear, J. H. S., & Douthwaite, M. (1938). **The Dog Tick Haemaphysalis Leachi as a Vector of Tick Typhus.**—*S. Afr. med. J.* **12.** 53-55. 5 figs. [1 ref.]

A case is described where a dog tick, *H.l.*, taken from a dog with septic tick bites, was crushed, emulsified and inoculated into a male g. pig intraperitoneally. The animal developed a febrile reaction and marked scrotal swelling. Rickettsiae were demonstrated in the tunica vaginalis. The strain was found to be identical with tick typhus from cases in man.—E. M. Robinson.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Kalmykov, E. S. (1937). Nočnaja pastjba, kak sposob zaščityi žibotnyh ot massovogo napadenija krovososuščih nasekomyh i ovodov. [**Night Grazing as a Means of Protecting Animals from Attacks of Blood-Sucking Flies**]. —*Sovyet. Vet.* **5.** 13-15. 2 tables.

K. recommends night grazing, and stabling by day, for the protection of cattle from attacks of blood-sucking flies.

Baranov, N. (1938). K poznavanju golubačke mušice VI (Studij golubačke musiče i njezinih sinbiocenonta). [**Studies on the Goiubatz Midge, VI**].—*Vet. Arhiv.* **8.** 313-328. [2 refs.] [German summary]. [See also *V. B.* **8.** 31].

After a short account of the plague of *Simulium* flies into Yugoslavia in 1937, which was a moderate one, B. gives a description of both larvae and pupae of a new species, for which a new genus, *Echinosimulium* was created; the fly is named *E. echinatum*. The sub-genus *Danubiosimulium*, has been promoted to a genus. Finally B. gives a list of arthropods caught on the wing in nets along with adult *Simulium* flies.—B. Oswald (Križevci).

Kissileff, A. (1938). **The Dog Flea as a Causative Agent in Summer Eczema.** —*J. Amer. vet. med. Ass.* **93.** 21-27. [9 refs.]

Summer eczema is described as a dermatitis resulting from continuous scratching or biting; its origin has been variously ascribed to food allergy, diet, worms, disease and heredity. K. suggests that it is essentially a response to flea bite. In nearly 700 dogs examined, he found a correlation between infestation and the disease, and describes an experiment showing that a dog, subject to summer eczema, developed a comparable train of symptoms in response to flea bite. Only certain dogs are highly sensitive to flea bite, but in such dogs successive bites are believed to renew itching in previous puncture sites, and mechanical friction similarly is thought to reawaken latent irritation.—J. MacLeod.

Anon. (1937). Ante-proyecto de ley de lucha contra la garrapata. [**Draft of a Law against Ticks**].—*Bol. mens. Direcc. Ganad. Montevideo.* **21.** 505-519.

This law aims at the eradication of ticks in Uruguay. Some £800,000 is provided for the campaign, and £20,000 would be allocated yearly to give effect to the project. Owners, or persons in charge of stock will be obliged to maintain them " tick-free ". The country will be divided into northern and southern zones by the Rio Negro, and the campaign will start in the south. Animals infested with live ticks may not be moved from their farms. Fines on a sliding scale for the

infraction of the many clauses are provided for, and declaration of infected premises is obligatory. The clearing up is to begin with simultaneous dippings of bovines and equines every 14-18 days until elimination. Sheep affected with *Boophilus microplus* will be similarly treated.

Stations for inoculation against " tristeza " in animals going to zones or countries where ticks exist are provided for, and also inspection stations at different transit points. Animals in transit which are found infested will be dipped (under police supervision if necessary) at the nearest available dipping place with some approved preparation at six-day intervals.—A. H. Hunter.

MacLeod, J. (1938). **Parasites of Sheep. Bulletin No. 2. The Sheep Tick,** *Ixodes ricinus*. pp. 27. 3 text figs., 4 figs. on 2 plates. London: Cooper Technical Bureau. [8vo].

This is written in non-technical language primarily for sheep farmers, though it is a very useful summary of tick-borne sheep diseases of the United Kingdom for veterinary surgeons.

The life-history of *I.r.* is given, and then louping ill and tick-borne fever are well described as examples of important causes of loss due to the tick. The importance of acclimatization of sheep on tick farms in Scotland and north England is then discussed and mention made of the stock diseases transmitted by *I.r.*—bovine piroplasmosis, louping ill in cattle and direct injury from tick bites.

Three methods of control for the tick are discussed :– serial dipping at short intervals, the use of protective dips (*i.e.*, dip substances which remain active for some time after the actual dipping), and combined serial dipping plus starvation of ticks. M. advocates the gradual " deticking " of farms by sections, the ticks on each section being destroyed by :– (a) collecting them on small lots of sheep which are then dipped repeatedly at weekly intervals in early summer, and (b) a natural process of starvation of surviving ticks during winter.—J. E.

Delpy, L. (1938). Les espèces iraniennes du genre *Haemaphysalis* Koch 1844. Identité d'*Haemaphysalis cholodskyi* Olenev 1928 et d'*H. cinnabarina* var. *cretica* Senevet et Caminopetros 1936. [**Iranian species of** *Haemaphysalis* **Infesting Domestic Animals**].—*Ann. Parasit. hum. comp.* **16.** 1-10. 4 figs., 3 tables. [9 refs.]

Four species of *Haemaphysalis* have been recorded from Iran, *viz*, *H. cinnabarina punctata*, *H. cholodskyi*, *H. concinna*, and *H. inermis*. These were all recovered from cattle, sheep or horses in the relatively humid and temperate regions near the Caspian Sea. *H. cholodskyi* was obtained at altitudes up to 3,000 metres.

D. suggests that *H. cinnabarina punctata* is synonymous with *H. cholodskyi*, which deserves specific rank. Distinguishing characters for the females of *H. concinna*, based on examination of reared specimens, and a key for the identification of the adults of the four species, are given.—J. MacLeod.

Colas-Belcour, J. (1937). Observation de lésions pathologiques chez des tiques du genre *Hyalomma*. [**Pathological Lesions in Hyalomma Ticks**]. —*Bull. Soc. Path. exot.* **30.** 876-878. 1 fig. on 1 plate. [3 refs.]

The author describes a pathological condition of the integument of two *Hyalomma* females, similar to that already described for this species by Russian workers [*V B.* **4.** 618]. Numerous small white vesicles were found distributed over the dorsal and ventral surfaces, and particularly along the lateral grooves. They apparently bore no relation to the glands of the integument. Mycelial filaments could not be demonstrated.—J. MacLeod.

Pigoury, L., Borde, R., & Nemeh, E. (1938). Quelques remarques sur la gale sarcoptique du chien : syndrome juvénile. Contagiosité au chien et à l'homme. **[Sarcoptic Mange in Dogs. Danger of Human Infection].**—*Rev. Med. vét., Toulouse.* **90.** 32-38. [6 refs.]

The length of time that elapsed between infection and the appearance of clinical symptoms of mange in dogs was 15-21 days. It was not necessary to take deep skin scrapings in order to demonstrate the parasite. The incubation period of canine mange affecting human beings is approximately 15 days.—H. Burrow.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Srivastava, H. D. (1938). **Helminthology in Relation to Veterinary Science.**—*Indian J. vet. Sci.* **8.** 113-118. [9 refs.]

Special stress is laid on the vast economic loss in all parts of the world from internal parasitism. In tropical countries this loss is particularly severe.

A brief account is given of the important helminth diseases of equines, ruminants, poultry, and canines, and reference is made to the importance, from a public health viewpoint, of the intercommunicability of some of the conditions between these animals and man.—D. D. Ogilvie.

Davies, T. I. (1938). **Some Factors Governing the Incidence of Helminth Parasites in the Domestic Duck.**—*Welsh J. Agric.* **14.** 280-287. 3 tables. [3 refs.]

An attempt is made to correlate the incidence of helminth parasites of ducks with the geographical position and physical nature of the feeding ground of the birds.

The rate of movement of surface waters largely determines the extent of infestation. Very few helminths occur in birds which feed in rapidly moving streams. Stagnant farm yard ponds, on the other hand, form ideal conditions for completion of the parasite life-cycle.

Trematodes appear to predominate in the ducks of southern England, while cestodes are of greatest moment in mid and south Wales. Trematodes in the latter region are unable to complete their cycle because, with insufficient lime in the rivers, snails cannot develop.

A list of the helminths of 29 ducks examined at Aberystwyth is incorporated. —D. D. Ogilvie.

Ameel, D. J. (1938). **The Morphology and Life Cycle of *Euryhelmis monorchis* (Trematoda) from the Mink.**—*J. Parasit.* **24.** 219-224. 5 figs. [5 refs.]

A new species of small heterophyid trematode, *Euryhelmis monorchis*, was collected from the small intestine of mink in Ohio and Michigan, U.S.A. Its characters follow closely those of the genus, except that its one testis is either absent or very transitory, and there is no seminal vesicle. The life-history is typical of the Heterophyidae, the first intermediate host being the operculate snail, *Pomatiopsis lapidaria*, while frogs and tadpoles serve as the second intermediate hosts. The cercariae are atypical in that they lack eyespots, and specialized spines at the oral aperture. The morphology and life-cycle of the fluke are discussed in detail. Rats and a cat have been infected experimentally. According to Witenberg's classification, the new species should be considered as an aberrant form of the sub-family Heterophyinae.—D. D. Ogilvie.

Africa, C. M. (1938). **An Attempt to Elucidate the Filtration of Eggs of Certain Heterophyid Trematodes into the General Circulation.**—*Philipp. J. anim. Indust.* **5.** 187-200. [12 refs.]

Examination of the intestine of mammals and birds showed that, at any rate in the case of *Haplorchis yokogawai*, a large number of flukes invade the interior of the mucosa, usually *via* the orifices of the intestinal glands. In birds A. found evidence that the villi could engulf the flukes in an amoeboid manner. Such a finding substantiates previous work on this subject. Once having passed into the mucosa, it would appear that the flukes never return to the lumen of the gut. This observation, together with the fact that the tissues show little or no reaction to live flukes, suggests that sexual maturity is attained in the gut wall, where egg filtration occurs into the contingent lymphatics and blood vessels.

Kittens provided an exception to the general findings. In no case could filtration be detected in them. Negative results in this respect were also recorded in an owl and a pelican.

Experimental infestation showed that the flukes became ovigerous six days after ingestión and attained full development in about 12 days.—D. D. Ogilvie.

Anon. (1937). A los señores hacendados y pobladores de la campaña. La dirección de ganaderia reclama su concurso para la lucha contra la hidatidosis. [**Control of Echinococcosis**].—*Bol. mens. Direcc. Ganad. Montevideo.* **21.** 388-393.

This is an appeal to disinfest dogs and to burn or bury dead animals. Frigorifico statistics for 1936 show that out of 833,806 cattle slaughtered, 83% of the adults and 33% of the young stock were affected. This represented a loss of some £100,000, the value of the livers of the affected cattle.—A. H. Hunter.

I. Kerr, K. B. (1938). **The Cellular Response in Acquired Resistance in Guinea Pigs to an Infection with Pig Ascaris.**—*Amer. J. Hyg.* **27.** 28-51. 4 figs. on 1 plate, 2 tables. [Numerous refs.]

II. Kerr, K. B. (1938). **Attempts to Induce an Artificial Immunity against the Dog Hookworm,** *Ancylostoma caninum*, **and the Pig Ascaris,** *Ascaris lumbricoides suum.*—*Ibid.* 52-59. 2 tables. [12 refs.] [See also *V. B.* **7.** 611].

I. A continuation of K's work on the exact pathology of helminths has shown that a definite resistance can be acquired by g. pigs against the larval stages of *A.l. suum*. An otherwise lethal dose of ascaris eggs can be withstood if the subject is " immunized " in the first instance with either single or multiple sub-lethal doses. Such resistance, however, is not sufficient to enable the g. pig to withstand more than twice the lethal dose, and it is of short duration.

The cellular reactions to infection of both resistant and non-resistant subjects were studied. The resistant g. pigs in general showed greater response, especially in the liver, which is concluded to be the most important organ of defence against the larvae. It is believed that the stimulation of the cellular response is due to an antibody formed by previous infection. A number of contradictory points require elucidation.

II. In view of the conflicting results of previous work in this field, an attempt was made to immunize mice against *Anc.c.* and g. pigs against *A.l. suum*. A large number of antigens were prepared by treatment of both adult worms and larvae, but the results in all cases were inconclusive. Ascaris antigen will produce hypersensitivity of the subject, but it is not established that immunity will follow.

[It seems possible that the test doses used in these experiments may have been

too large. In such an event any immunity which was present would have been overwhelmed and hence undetected].—D. D. Ogilvie.

Ortlepp, R. J. (1937). **Whipworms from South African Ruminants.**—*Onderstepoort J. vet. Sci.* **9.** 91-100. 7 figs. [13 refs.]

O. discusses the morphology and the occurrence in South Africa of *Trichuris globulosa* (var. Linstow). In addition he describes three new species, namely *Tr. barbertonensis* from cattle, *Tr. antidorchi* from springbok and blesbok and *Tr. parvispiculum* from goats.

Lieke, P. (1938). Ueber den Einfluss von Kalidüngemitteln auf die Eier und Larven der Pferdestrongyliden. [**Effect of Potassium Fertilizers on the Eggs and Larvae of Horse Strongyles**].—*Dtsch. tierärztl. Wschr.* **46.** 197-203. [Numerous refs.]

L. tested the action *in vitro* and in manure of kainit, K_2SO_4, potassium-magnesium sulphate, and a nitrophosphate fertilizer on the eggs and larvae of horse strongyles. To kill the eggs, a minimum strength of 10% kainit acting for four days, or a 20% solution of K_2SO_4 acting for six days, was necessary; the other two substances were practically useless. Tests suggested that the kainit owed its vermicidal action to KCl, a 5% solution of which killed eggs in 48 hours, and to NaCl, of which 0·9% quickly destroyed eggs, but a saturated solution did not, even after ten hours.

Newly hatched larvae were killed by 15% KCl in 24 hours, by 10% KCl in 48 hours, and by 5% NaCl in 24 hours. Heavily infested faeces were diluted and mixed with kainit, kainit plus $CuSO_4$ or with chalk-urea (" Kalkharnstoff ", containing 20% N and 48% $CaCO_3$) in concentrations corresponding to those which would be used in dressing land, results being given in weight used per hectare. Kainit (32 cwt per hectare) killed all the eggs within five days, kainit plus $CuSO_4$ (4 : 1 at 7 cwt per ha.) killed all eggs in three days. Chalk-urea (7 cwt per ha.) was ineffective against the eggs.

Tests were next made on infected faeces dropped or scattered on the surface of soil placed in boxes, the fertilizers being added to different samples dry as well as in solution. Kainit, both dry and in solution, arrested the development of larvae when applied in concentrations of 12, 16 or 32 cwt per ha. Kainit plus $CuSO_4$ (4 : 1, 4 : 2 or 4 : 3 at 6 or 7 cwt per ha.) had the same effect, while chalk-urea (7 cwt per ha.) was inactive: 32 cwt of a mixture of 1 part of slaked lime to 4 parts of kainit per ha. killed the eggs in a few hours.

The article contains many quotations from similar work by others.—J. E.

Schwartz, B. (1938). **Trichinosis in Swine and its Relationship to Public Health.**—*J. Amer. vet. met. Ass.* **92.** 317-355. 1 fig., 1 table. [16 refs.]

S. gives a description of trichinosis in swine, and mentions important outbreaks of human trichinosis in Germany. In the U.S.A., out of 6,662 samples of pork obtained from grain-fed pigs, 60 (0·91%) were found to be infested. Of 6,684 samples from pigs fed on garbage as collected, 286 (4·41%) were infested. Of 19,870 pigs fed on cooked garbage only 11 (0·55%) were infested. He concludes, therefore, that the feeding of uncooked garbage favours the spread of trichina infestation among pigs, owing to the presence of infected pork, and that cooking of garbage reduces the incidence.

The examination was carried out by the digestion method; this is more precise than the microscopic method, in which trichinae are often overlooked. Figures obtained as a result of experimental infection of pigs with varying doses

of trichina larvae showed that the host animal in question presented no readily recognizable symptoms when the resulting infestation was due to less than 500-900 larvae per gram of diaphragm muscle tissue. Pigs with heavier infestation showed clinical symptoms during the active stage of the disease (wandering stage) *e.g.*, digestive disturbances, muscular stiffness, inappetence, fever and oedema—all symptoms which are not pathognomic of any particular swine disease.

Methods of control and eradication involve improved husbandry, elimination of meat from scrap barrels, and the control of rats. Since human beings acquire trichinosis as a result of eating raw or insufficiently cooked pork, or food-products containing affected pork muscle tissue, public health officials should educate the public on the dangers of eating any but well cooked pork.—M. F. Benjamin.

Ortlepp, R. J. (1937). **A Hitherto Unrecorded Filaria, *Suifilaria suis*, N.G., N.Sp., from the Domestic Pig in South Africa.**—*Onderstepoort J. vet. Sci.* **9.** 85-89. 3 figs. [6 refs.]

O. describes a new filaroid parasite found free or encysted in the fasciae of the muscles of the domestic pig. The males are 17-25 mm. long, and the females, 32-40 mm. long. They are characterized by the presence of two auricular-like structures near the mouth, the presence of a small buccal capsule, the vulva very near the mouth, two unequal and dissimilar spicules, the tail of the female truncated and tuberculate, and the tail of the male coiled, alate on one side and carrying six pairs of small papillae.

Kemper, H. E. (1938). **Filarial Dermatosis of Sheep.**—*N. Amer. Vet.* No. 9. **19.** 36-41. 2 figs., 1 table. [2 refs.]

A hitherto unrecorded dermatosis of sheep is described, from Catron County, New Mexico. The condition occurs in ewes, mostly between two and six years old, in limited areas of the country. Lambs and rams are never affected. The lesions occur on the poll, face, abdomen, and feet, and are characterized by a chronic dermatitis, with tissue proliferation, furunculosis, and intense pruritus. Scab formation occurs in recurrent cycles over a long period; there is little tendency for the original lesions to increase in size unless through rubbing.

Examination of the skin of diseased areas revealed the presence of a new species of microfilaria, *Elaeophora schneideri*. On autopsy, numerous adult helminths were found in the carotid, mesenteric and iliac arteries. A consideration of the condition suggests that an arthropod intermediate host probably plays a part in the life-cycle of the parasite.

Local treatment was of no avail, but fouadin intramuscularly in doses of 4-8 c.c. daily till at least 88 c.c. had been given was specific.

This is thought to be the first instance in which blood-inhabiting filarids have been recorded in sheep.—D. D. Ogilvie.

IMMUNITY

Downham, K. D., & Venn, J. A. J. (1938). **Tuberculin Testing of Ducks.**—*Vet. Rec.* **50.** 431-432. 4 plates.

The site most commonly used for the intradermal tuberculin test in ducks is the web of the foot. For a number of reasons this site is unsatisfactory. The capillary blood supply is poor, and the amount of connective tissue is considerable. The authors tried the intradermal tuberculin test on the skin of the back of the neck, the site having been denuded of feathers. The skin at this point being very

thin, a fine needle, such as No. 19, was used, and the dose employed was 0·1 c.c. of the special avian tuberculin. Positive reactors showed oedematous swelling in 24 hours.

The method was employed in artificially infected ducks, and in normal ducks intended for export. [The number of ducks examined P.M. to check the results seems to have been inadequate].—D. L. HUGHES.

ZDRODOVSKIĬ, P. (1937). Problema allergičeskoi diagnostiki brucelleza. (Liter.-kritičeski očerk). [**Allergic Diagnosis of Brucellosis. A Critical Review**]. —*Brucellosis in Sheep*. pp. 205-224. [Numerous refs.] Moscow: Viem Publ. Dept.

In giving a general review of the literature dealing with methods for diagnosing brucellosis in man and in animals, Z. points out advantages of the allergic tests method over the bacteriological and serological methods; the two latter, besides being laborious, require the installation of special laboratories and the co-operation of well-trained specialists, thus rendering their use prohibitive for wide-scale practice. [Z. contemplates the issue of a useful skin-test preparation to shepherds so that they might do their own tests].

He adduces evidence both from literature and from the work of the Commission of which he was in charge to show that the allergic reaction is specific and constant in animals either naturally or experimentally infected with brucellosis. From his own experience he states that in human beings who are either chronically affected with brucellosis or latent carriers of the infection, inhalation of dried brucella cultures or of atomized suspensions causes a febrile condition, accompanied by headache, pains in the joints and muscles, asthma, and a psychic condition (euphoria).

Extensive trials by the Commission demonstrated that antigen preparations so far used in the West, such as the English and French brucellin or the Italian anabortin, are unsatisfactory in that the reaction they cause is not always constant in its manifestations, and in that they tend frequently to cause the formation of hard infiltrations, their diagnostic value being thereby obscured. A further disadvantage of these preparations in the opinion of the Commission, is that they do not constantly react specifically, and that all have a marked sensitizing effect on the animals tested, rendering the latter unsuitable for subsequent control tests at intervals of time that are useful in practice. On the other hand "brucellysate", as prepared by the Commission, marks a very considerable advance, since it has little, if any, sensitizing action on healthy animals, and has only a very slight tendency to give non-specific reactions.

In 1933 and 1934 "brucellysate" was prepared by repeated washing of living three-day-old brucella cultures [the strain is not specified in this paper, but in a following paper—see p. 97—it is stated to have been derived from a living culture of *Br. suis* received from DUBOIS], grown on glucose or liver agar [preparation not described], and centrifuged in physiological solution; the resulting bacterial mass is dried in a high vacuum and then, while still alive, ground in a mortar with quartz sand until the bacterial cells are thoroughly triturated; the residue is then extracted in physiological solution or in a boracic buffer solution (pH 7·6 to 8·0), at the rate of 1 g. dry bacterial mass to one litre of the solution. The extract is passed through a bacterial filter candle [type not stated] and its nitrogen content is titrated, as determined by Kjeldahl's method. Before being enclosed in sealed ampoules the extract may be heated for one hour at 60°C. without destruction of any of its properties. It is claimed that this method gives a very constant, practically standardized amount of bacterial protein, and further

that it possesses the advantage of being a very nearly pure solution of the protein, with only a slight admixture of fragments of bacterial cell walls, which improved methods of purification may eventually eliminate.

The working dose for allergic tests on sheep is 0·2-0·3 c.c. of the extract, containing from 0·00001 to 0·000015 mg. nitrogen.

The remainder of the paper is devoted to a brief discussion of the excellent results reported to have been obtained by the Commission on the experimental farm with " brucellysate ", chiefly in the building up of healthy flocks from the diseased stocks [see below].

Zdrodovskiĭ, P., Voskresenskiĭ, B., & Golinevic, E. (1937). O sensibilizirujuśčih svojstvah brucellora i brucellizata. [**Sensitizing Properties of " Brucellore " and " Brucellysate "**].—*Brucellosis in Sheep.* pp. 251-256. 3 tables. Moscow : Viem Publ. Dept.

The experiments described in this paper were carried out at the Sukhum (Black Sea littoral) Branch of the All-Union Institute of Experimental Medicine, independently of the Commission to North Caucasus, for the purpose of determining the sensitizing properties of " brucellore " (prepared in the usual way from emulsions of a strain of *Br. suis* received from Dubois, which were killed by heating at 70°C.) and " brucellysate " prepared from the same strain. The tests were made on a total of 125 healthy ewes and 36 rabbits which received from one to ten injections (subcutaneously, intradermally, or intravenously) of 1 c.c. of either preparation. The results showed that, when tested 15 days after the last injection with 0·1 c.c. of either preparation, none of the animals treated with " brucellysate " showed any noticeable sensitization to that antigen, but ewes which had received three or more injections exhibited a slight local reaction when subsequently tested with " brucellore ". On the other hand, a single injection of " brucellore " by any route was sufficient to cause, in a high percentage of the animals, a noticeable, and in some cases even well-marked sensitization to subsequent intradermal injection of either antigen, sometimes accompanied by definite necrosis at the point of injection.

[The preparation " brucellore " appears to have been an ordinary heat-killed suspension. In other papers of the series contained within this publication the term " brucellin " is frequently used. It is not clear whether the terms " brucellin " and brucellore used in this series of papers refer to different preparations or not].

Zdrodovskiĭ, P. (1937). Allergičeskaja diagnostika brucelleza u ovec s pomośćju brucellizata i brucellina. [**Allergic Diagnosis of Brucellosis in Sheep by Means of " Brucellysate " and Brucellin**].—*Brucellosis in Sheep.* pp. 257-293. 13 tables, 2 graphs, 2 diagrams. Moscow : Viem Publ. Dept.

A detailed account is given of an extensive range of tests, during the three years of the Commission's activity on the North Caucasus Experimental Farm, to determine the relative merits and demerits of brucellin and " brucellysate ", both of which were prepared from the same strain of *Br. suis*, received from Dubois.

Z. states that, owing to the lack of adequate laboratory installation and equipment, the " brucellysate " prepared during the first two years varied somewhat in quality, probably because of defective standardization of its protein content, and that the reactions it caused were not constant. A considerable improvement of the preparation was attained by the following technique :– three-day-old cultures of the organism, grown in Erlenmeyer flasks on glycerin-glucose agar or liver agar [preparation not described] with a pH value of 6·8, are washed off with physiological solution and centrifuged until they are entirely freed from any trace of the

nutrient substrate and from autolytic products of the bacteria. The thick bacterial mass is then dried in a high vacuum in the presence of a sufficient quantity of calcium chloride, in order that the process may be completed overnight, and thus ensure that the bacteria are still living when subjected to trituration. This precaution is stated to be extremely important in order to avoid any alteration (denaturation) of the bacterial proteins by autolysis, and is claimed to be the essential feature distinguishing this method from those employed outside the U.S.S.R. The dry bacterial mass is then ground in a Jouan (Paris) bacterial mill with stainless steel balls, and the resulting completely amorphous mass is extracted with either physiological solution or a boracic buffer solution (pH 8·0-8·2), in the proportion of 200 c.c. solution to 1 g. of the dry bacterial mass, and is filtered through a Chamberland filter. The filtrate, a completely clear liquid, is termed " brucellysate ". Its nitrogen content is titrated, and for use it is diluted to contain about 0·005 % nitrogen ; the working dose for a sheep is 0·2 c.c., given intradermally.

In the remainder of the paper Z. discusses at length the technique of the allergic tests on sheep, as well as such points as the normal course of the reactions, including weak or doubtful reactions, the specific nature and diagnostic value of the reaction, the phenomenon of desensitization of the animals through repeated injections of brucellin and " brucellysate ", the effect on the reaction of intercurrent infections or other pathological conditions, the sensitization of healthy animals by " brucellysate ", and the possibility of using the allergic tests for the building up of healthy flocks in those regions in which where the disease is epizootic. He considers that the results of the work performed by the Commission have amply proved that, of all the methods so far recommended for the diagnosis of brucellosis in sheep, the allergic test with " brucellysate " is of outstanding value because it is highly sensitive, and the reactions it causes are specific. [There does not appear to be any evidence that the method used for the preparation of " brucellysate is different in any significant respect from that used by R. M. Taylor—*V.B.* **6.** 111].

Otero, P. M., & González, L. M. (1938). **Purified Protein Antigen from Brucella.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 703-705. 1 table. [8 refs.]

A modification of Seibert's method for the preparation of purified protein derivative from tuberculin [*V. B.* **3.** 714, and **6.** 55.] was applied to a carbol-saline suspension of *Br. abortus* to obtain a standard preparation which would serve as a good antigen, could be accurately measured, and would undergo the least possible denaturation. The final protein product was fairly constant in nitrogen and polysaccharide content, was thermostable, easily soluble in alkaline solution, and gave positive precipitin and complement-fixation tests with the sera of rabbits inoculated with brucella. Intradermal injection of 0·005 mg. into g. pigs, previously infected with brucella, caused a definite skin reaction lasting more than 48 hours.

—R. O. Muir.

Blagowechensky, N. N. (1938). Durée du séjour de l'antigène dans l'organisme et immunité. [**Connexion between Immunity and the Duration of the Antigen in the Organism**].—*Rev. Immunol.* **4.** 161-174. 2 tables. [11 refs.]

B. used an alum precipitated diphtheria anatoxin on 40 g. pigs. All were injected (intraderm.) in the flank with 0·1 c.c. doses, and the skin at the injection site was excised aseptically from about half of them, the intervals covered being 1, 3, 5, 10, 20, 30 and 45 days. These pieces of skin were examined for alum, which was found in most cases. A histological lesion was invariably present at the 45th day, although not seen macroscopically at this stage.

The biopsied and control g. pigs were submitted to the Schick test (once only in most cases) and their serum antitoxin was titrated at short intervals, these tests being made 12-13 months after the immunization. Final tests were made by injecting large doses of toxin. A high degree of immunity was conferred by the one injection, but the antitoxin reaction was very variable and there was no significant difference between the antitoxin titre of the biopsied and the other test animals. No definite correlation between a Schick reaction and antitoxin titre could be determined in g. pigs. The latter was generally more persistent. The slow absorption of this type of anatoxin, which was favoured by the dermal injection and took at least 45 days, appeared to be in proportion to its immunizing power. —C. V. Watkins.

Kestner, O. (1938). **Antibodies Organ-Specific against the Anterior Body of the Pituitary Gland.**—*J. Physiol.* **92.** 273-275. 3 tables. [4 refs.]

A serum was prepared by injecting rabbits repeatedly with a simple saline extract of bovine anterior pituitaries. The injection of such a serum into rats considerably reduced the specific dynamic action of ingested raw meat and slowed the basal metabolic rate.—J. M. Robson.

Landsteiner, K., & Pirie, N. W. (1937). **Serological Specificity in Pyridine Derivatives.**—*J. Immunol.* **33.** 265-270. [15 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 158. Signed W. W. C. Topley].

The authors record a series of experiments on the specificity of synthetic azoprotein antigens prepared from pyridine derivatives. Using three antigens prepared from 3-amino pyridine, 3-amino-2-carboxy pyridine and 3-amino-4-carboxy pyridine, cross precipitation tests showed almost complete specificity, the only exception being a trace of precipitation with an antigen prepared from 3-amino-4-carboxy pyridine, and an antiserum against 3-amino-2-carboxy pyridine.

As in other cases, inhibition reactions showed less specificity than the direct precipitin tests. Thus pyridine was found to inhibit the reaction between 3-amino pyridine and the homologous antiserum, and various carboxy derivatives inhibited the reaction between the 3-amino-4-carboxy pyridine, or 3-amino-2-carboxy pyridine, and the corresponding antiserum when the substance tested for inhibition had a carboxyl group in the same position with reference to the nitrogen of the pyridine ring as that occupied by the carboxyl group of the synthetic antigen.

DISEASES, GENERAL

I. Manninger, R., & Kotlan, A. (1938). Influence des conditions de l'élevage, de l'alimentation et de l'entretien des animaux sur la genèse, l'évolution et la persistance des maladies infectieuses et parasitaires. **[Influence of Animal Husbandry and Nutrition on Infectious and Parasitic Diseases]**.—*Bull. Off. internat. Epiz.* **16.** 62-82. Discussion pp. 376-390.

II. Wagener, K. (1938). Influence des conditions de l'élevage, de l'alimentation et de l'entretien des animaux sur la genèse, l'évolution et la persistance des maladies infectieuse et parasitaires des animaux domestiques. **[Influence of Animal Nutrition and Husbandry in Infectious and Parasitic Diseases in Domestic Animals]**.—*Ibid.* 84-121. Discussion pp. 376-390.

I. This report deals in general terms with the effect of environmental factors on the genesis of contagious diseases in animals. The authors analyse the role of exposure and susceptibility in the causation of animal disease. They examine

the relationships between the incidence of various animal diseases and the systems under which the animals are kept—*e.g.*, in stables or at pasture. The survival of disease-causing agents outside the animal body has an important bearing on this aspect. Susceptibility, on the other hand, depends on the complex interaction of the hereditary and acquired characters of the animal. The latter are discussed with relation to the conditions of housing, work, feeding and rearing. Parasitic infestations are dealt with from the following aspects :– degree of infestation, species resistance, age susceptibility, the effect of superimposed infestation with two or more parasites, and the effect of nutritional factors.

II. In this report W. limits his observations to the influences which feeding, rearing and maintenance exert on predisposition to infection with bacterial and parasitic agents. He points out that in the domestication and artificial selection of animals man has tended to lower their natural resistance to disease ; contributory factors to this are early maturity, housing and feeding. In his opinion, the methods of feeding animals under conditions of domestication play the most important part in predisposition to disease. He discusses the significance of protein-rich diets used in intensive production methods ; the troubles arising from such diets are said to be the result of maladjustment between minerals, vitamins and excess proteins. There is as yet little information available regarding the relationship between vitamins A, C and D and the infectious diseases of domestic animals. An important conclusion is that the feeding and maintenance of domestic animals is intimately related to the aetiology of reproductive disorders.

—N. J. Scorgie.

I. Marczewski. (1938). **Bovine Tuberculosis and Brucellosis in Poland.**—*Mon. Bull. agric. Sci.* **29.** 148T-149T.

II. van Goidsenhoven, C., & Boes, J. (1938). **Bovine Brucellosis and Tuberculosis in Belgium.**—*Ibid.* 190T-198T.

I. The cases of TB. in Poland verified after slaughter at abattoirs amount to 8%. Compulsory notification is necessary for TB. of the udder, lung, uterus and intestines, and in udder infection slaughter is compulsory and is compensated. In other cases slaughter may be ordered according to circumstances. A voluntary control system is also in force in which Government assistance is limited to sanitary inspection, clinical examination and tuberculin testing.

Contagious abortion is not notifiable. Control schemes have been drawn up and will shortly be undertaken on farms on which TB. control is also practised in accordance with approved plans. The plans for abortion control are of three types :– (a) disposal of reactors ; (b) semi-isolation, and (c) segregation of cattle both when confined and at pasture, and the subjection of fresh stock to very strict measures [not specified]. The most suitable plan for each farm will be selected by agreement. Special accommodation for calving must be provided.

II. Both the diseases dealt with are prevalent, but are not legally notifiable. It is estimated that of 960,000 dairy cows in Belgium, 10% abort annually, with a loss of 148 million litres of milk. Brucella infection appears to be increasing, and in 1936, 3,640 positive results were found in 8,492 tests. Voluntary control is encouraged by free testing, and live vaccine is only issued when infection is severe.

Some 15,000 cattle are affected annually with TB. Compulsory preventive measures have been replaced by voluntary control, which includes government certification of free herds, nullification of sale of infected animals, and subsidies to associations undertaking collective control. Imported cattle are inspected and in approved cases quarantined pending tuberculin tests. The ophthalmic and

intradermal tests are used, and also the subcutaneous test in doubtful cases. Positive reactors are returned to the country of origin.

No systematic study has yet been made in Belgium on the transmission of these diseases to man. Human brucellosis exists, but appears to be very limited in extent.—S. J. GILBERT.

HENDERSON, J. A. (1938). **Observations on Reproduction and Associated Conditions in a Herd of Dairy Cattle.**—*Cornell Vet.* **28.** 173-195. 13 tables. [17 refs.]

From the records of a high-producing dairy herd data of veterinary interest are presented.

The average gestation period of all cows was 280·3 days. Left horn pregnancies numbered 43% and right horn 57%, a proportion which is in general agreement with previous figures. Twins were carried, on the average, four days less than single calves. There was some indication that twinning might be associated with ovarian dysfunction.

Although the cattle were brucella-free, 13·9% of pregnancies terminated in abortion, the tendency to abort increasing with age. Dystocia occurred in 13·1% of parturitions, the greater number of cases being in first-calf heifers.

Retained placenta was noted in 12·9% of cases.

Trichomoniasis had serious effects on the reproductive functions, although recovered animals showed resistance.

The greatest incidence of milk fever was at about the fifth calving. No cases occurred with first calves, and very few with second calves. Many were complicated by concurrent conditions. A seasonal susceptibility between May and September was noted.

Acetonaemia often occurred in relation to reproductive conditions, especially with third and fourth calves. Susceptibility increased during the winter months. There was a satisfactory response to glucose medication.—D. D. OGILVIE.

RISER, W. A. (1938). **The Control of the Milk Supply for an Iowa Institution.**—*J. Amer. vet. med. Ass.* **92.** 645-652.

An account of the hygienic methods applied to control disease and improve production in a dairy herd of a state institution. In four and a half years calf mortality was reduced from 50% to 5%, *Brucella abortus* infection eliminated, milk production raised from 269 to 429 lb. per cow, and the quality of the milk greatly improved. When the control commenced, 30% of the herd were positive to the agglutination test for *Br.a.* infection, whilst 25 cows were sterile; by the end of the period here dealt with only three cows were under treatment for sterility. [No indication of the number of cattle in the herd is given].—H. E. BYWATER.

TURBET, C. R. (1937). **Veterinary Notes [Diseases in Fiji].**—*Agric. J. Fiji.* **8.** No. 4. pp. 37-40.

In 1931 the incidence of bovine tuberculosis in the Suva District, as disclosed by the tuberculin test, was 18%. In 1935 only 0·4% reacted to the test. The inoculation of non-pregnant heifers with live *abortus* vaccine on farms where contagious abortion is rife is an economic measure and the incidence of the disease is greatly reduced thereby. Amongst skin diseases in dogs, laboratory investigation has shown a form of dermatomycosis to be most common. Infectious keratitis occurs fairly frequently amongst cattle.—C. R. TURBET.

I. Mitchell, W. M. (1937). **" Rheumatic Disease " in the Horse (Osteo-Arthritis and Allied Conditions).**—*J. comp. Path.* **50.** 282-286. [9 refs.]

II. Kelser, R. A., & Callender, G. R. (1938). **Equine Degenerative Arthritis.** —*Vet. Med.* **33.** 307-320. 23 figs., 1 table. [18 refs.]

III. Callender, G. R., & Kelser, R. A. (1938). **Degenerative Arthritis. A Comparison of the Pathological Changes in Man and Equines.**—*Amer. J. Path.* **14.** 253-272. 26 figs. on 5 plates. [14 refs.]

I. This is a brief outline of M's investigations on the chronic disabling diseases of horses [see *V. B.* **4.** 375; **6.** 444, **7.** 435.], in which he summarizes the results of extensive P.M. examinations. In young and old horses suffering from " shivering ", the most constant sites of pathological lesions were the joints and the peripheral nerves. Microscopic examination of the femoral and sciatic nerves revealed extensive degeneration of the motor fibres, restricted to localized patches. There was also evidence of wide-spread disease throughout the body, *e.g.*, hyperplasia of lymph nodes, fibrositis of the terminal part of the oesophagus, atrophy of the laryngeal muscles, and gastric ulcers, and M. states that these lesions were probably related to the peripheral nerve degeneration. Stringhalt, partial paraplegia, roaring and probably functional heart disease may also arise from nerve damage. Deficiency of vitamin A and $CaO : P_2O_5$ imbalance are being investigated as possible factors in the aetiology.

II. This paper presents the results of an investigation into the high incidence of lameness amongst U.S. Army horses and mules in Panama. In a considerable number of the animals which were slaughtered, the most characteristic lesion was found to be a degenerative arthritis involving particularly the joints of the limbs. The pathological findings are described in detail. Macroscopically, the lesions varied from slight grooves and small " blisters ", primarily involving the superficial layers of cartilage, to extensive ulceration of the articular surfaces. Histological examination revealed that the changes were non-inflammatory and primarily involved only the articular cartilage; bone changes might occur secondarily, but there was no evidence of any relationship between the productive changes producing spavin, ringbone, etc., and the condition described here. Comparative studies showed that this condition is associated in no way with osteomalacia. It is apparently not of bacterial origin. The pathological changes suggest that the condition is a deficiency disease in which a disturbance occurs in the nutrition of the articular cartilages. The aetiology is discussed with particular reference to minerals and vitamins, without any conclusions being reached.

III. The authors present a comparative study of the lesions of degenerative arthritis in human beings and equines (see also II, above). The gross and histological changes in a series of 60 specimens from human beings and from 54 horses and mules are described. The findings indicate the sequence of events which takes place in the joints in degenerative arthritis. The lesions in human beings and in equines were practically identical in character. The primary degenerative change starts in the cartilage, the earliest lesions being grooves or blisters. This is followed by various degrees of ulceration, until in advanced lesions there is eburnation of the bared bony cortex accompanied by a bony hypertrophy which appears to be of a compensatory character. The production of this new bone always occurs from the calcified matrix and sub-chondral bone, never from the periosteum [cf. spavin]. In man especially the lesions may be symptomless, but animals, presumably owing to their greater physical activity, often show clinical manifestations from less advanced lesions than man.

The aetiology of degenerative arthritis remains undetermined, but the authors suggest that the lesions are due to chemical and physio-chemical changes in the

cartilage. In equines at least there is some possibility that these changes are related to mineral imbalance and/or deficiency in vitamins A and D.—N. J. Scorgie.

I. Gomez, A. K., & Gonzaga, A. C. (1938). **A Simple and Practical Test for the Diagnosis of Equine Osteomalacia.**—*Philipp. J. anim. Indust.* **5.** 217-220. 3 plates. [2 refs.]

II. Genevois, & Buck. (1938). Contribution à l'étude de l'ostéofibrose des équidés à Madagascar. [**Equine Oesteofibrosis in Madagascar**].—*Bull. Acad. vét. Fr.* **11.** 410-411.

I. The test described is claimed to be useful in the diagnosis of incipient equine osteomalacia. It consists in the insertion of a small stylet through the facial bones into the frontal sinus at a point mid-way between the inner canthi of the eyes. A positive diagnosis is made if the stylet passes easily through the bones; in a negative case this operation is not possible, as the bones are hard and the animal objects to the pain.

II. A short note dealing with the methods available for the early diagnosis of equine osteofibrosis. For early diagnosis the authors regard estimation of phosphoric acid in the urine and calcium in the blood serum as being the most useful tests. They outline the methods, specially applicable to Madagascar conditions, which they have adopted for the prevention and treatment of the disease. —N. J. Scorgie.

Hole, N. H. (1938). **Three Cases of Nodular Necrosis (Roeckl's Granuloma) in the Muscles of Cattle.**—*J. comp. Path.* **51.** 9-22. 10 figs. [13 refs.]

H. describes three cases in cattle of nodular necrosis in the superficial muscles, particularly the panniculus and the muscles of the tail. The lesions were the size of a hazel-nut, and possessed a dense fibrous capsule surrounding a zone of loose connective tissue which contained leucocytes, plasma cells and pus cells; in the centre there was a necrotic zone. The presence of true giant cells was also noted, but eosinophiles were not seen in the connective tissue zone.

Bacteriological examinations were negative, and although evidence of a sarcosporidial infestation was present, it is considered that the parasites were present in the muscles before the nodular lesions developed, and happened to be engulfed by them. In one case, visible lesions developed to their maximum in about six weeks (from the time of their first appearance) and then underwent spontaneous regression, no visible lesions being seen or felt four months later. It is suggested that lesions have not yet been examined at a sufficiently early stage of development to enable the aetiological agent, if any, to be detected.—J. A. Nicholson.

Hagmann, A. (1938). Beitrag zur Kenntnis der Muskelknoten beim Rinde. [**Muscle Nodules in Cattle**].—*Z. Fleisch- u. Milchhyg.* **48.** 361-365. 1 fig. [9 refs.]

Numerous yellowish-grey, oval nodules of varying size were observed in the neck and abdominal muscles of a 2½-year-old bullock. Histological examination showed that they developed as the result of an infiltration between the muscle fibres, and that, when fully formed, they possessed a well defined capsule composed of connective tissue, isolated muscle fibres, and eosinophiles surrounding a layer of granulation tissue consisting chiefly of spindle-shaped fibroblasts and capillaries. At the centre of the nodule there was a necrotic area, and scattered through this were small collections of cell debris. These appeared as yellowish points which could easily be squeezed out of the general necrotic mass. In the neighbouring muscle tissue several Miescher's tubes were present, indicating an accompanying

sarcosporidial infestation. H. suggests that the muscle lesions were, in fact, produced as a result of such an infestation, and that on occasion, sarcosporidia may produce a chronic inflammatory reaction in muscle.—J. A. NICHOLSON.

BERTHELON, & LABEYRIE. (1938). Observations sur l'anasarque des bovidés. [**" Bovine Anasarca"**].—*Rec. Méd. vét.* **114.** 321-325. 1 fig.

The condition here spoken of as "bovine anasarca" occurs in the Basses Pyrénées, and is characterized by congestion of the skin and mucous membranes, and oedema of the cutaneous and subcutaneous connective tissues, followed by necrosis. Symptoms set in suddenly with a rise of temperature, and accelerated respirations and the characteristic skin changes then develop. The aetiology is unknown, but the condition appears to be infectious and occurs chiefly in the spring.

—J. A. NICHOLSON.

I. TAYLOR, E. L. (1937). **Does Jaagsiekte Occur in Great Britain ?**—*J. comp. Path.* **50.** 317-320. [7 refs.]

II. DUNGAL, N., GÍSLASON, G., & TAYLOR, E. L. (1938). **Epizootic Adenomatosis in the Lungs of Sheep—Comparisons with Jaagsiekte, Verminous Pneumonia and Progressive Pneumonia.**—*Ibid.* **51.** 46-68. 8 figs., 3 tables. [11 refs.]

III. M'FADYEAN, J. (1938). **Jaagsiekte.**—*Ibid.* 78-84.

I. It is suggested that the disease described in sheep by M'FADYEAN in 1888 and 1894, and more fully in 1920, may be the same as jaagsiekte in South Africa, " progressive pneumonia of sheep " in Montana and " Deildartunga disease " in Iceland [*V. B.* **8.** 651]. The histological appearances of all four conditions are similar, and the last three are definitely not caused by parasitic worms ; the first was regarded by M'FADYEAN as due to a severe infestation with lungworms.

II. During the previous two years a lung disease of sheep, almost certainly introduced into Iceland by the importation from Germany in 1933 of an affected yearling ram, spread rapidly and resulted in a mortality of 50-80 % of the whole stock on many farms. The disease usually runs a chronic course, and the incubation period is 6-8 months or longer. The onset is insidious and the disease is not easily recognized in the early stages. The symptoms commence with an occasional cough, followed by respiratory distress on exertion, the presence of moist râles, especially in the inferior parts of the lungs, and an enormous increase in bronchial secretion. Sudden death may occur when the animals are subjected to muscular exertion, or secondary infections may supervene. Recovery is extremely rare.

The pathological changes are confined to the lungs, which are enlarged and studded with firm greyish nodules, irregular in shape and varying in diameter from 1 to 10 mm. The lesions are quite easily distinguished from those produced by *Muellerius capillaris*. Histologically, the affected areas resemble adenomata, and correspond to the descriptions of jaagsiekte, to " verminous pneumonia " [M'FADYEAN, (1888). *J. comp. Path.* **1.** 139.] and, to a certain extent, to COWDRY's " progressive pneumonia of sheep " [(1925-1926). *J. exp. Med.* **42.** 323 and 335, and **44.** 571].

Attempts to identify bacteria, protozoa, and viruses which might be responsible for the condition have failed. Certain strains of sheep are particularly susceptible. Transmission of the disease from infected to healthy animals is especially common when they are housed together ; infection appears rarely to be contracted when the animals are at pasture.

It is claimed that intrapulmonary injection into three lambs of an emulsion of typical lesions was successful in reproducing the disease in one of the animals.

The wide-spread occurrence in Iceland of worm infestation in the absence of adenomatosis is considered to prove that these parasites are not the aetiological agent. Experimental infection of two sheep at Weybridge with larvae of *M.c.* sent from Iceland failed to produce adenomatous lesions in the lungs, although typical worm nodules were found at autopsy.

III. The literature dealing with jaagsiekte and progressive pneumonia of sheep is reviewed, with particular reference to the histological features of these conditions. It is stated that the conditions described by the author in 1894 and 1920 were undoubtedly jaagsiekte. The lesions are considered to represent "inflammatory new growths" which render the respiratory epithelium functionless: a virus is suggested as the most probable cause.—E. G. White.

Spanu, P. (1938). Ereditatea "brahignatismului inferior" la cal. [**Inheritance of Inferior Brachygnathism in the Horse**].—*Rev. Med. vet., Bucuresti.* **50.** 141-157. 4 figs. [8 refs.] [Abst. from German summary].

S. examined the horses of two pedigree strains and observed overshot jaw in four out of 713 (0·56%) in the one strain, and in six out of 1,403 (0·42%) in the other, in otherwise normal foals. An affected stallion of the first strain, when mated with normal mares, sired two affected and 63 normal foals. S. noted that when brachygnathism was the only malformation it was sex-linked, but that complex malformations occurred in which brachygnathism was part of the deformity, and that in these cases the condition was not sex-linked, but had a recessive hereditary factor. He will undertake further breeding experiments, by mating an affected mare with a normal stallion, and an affected stallion with a normal mare.

Newsom, I. E. (1938). **Urinary Calculi with Special Reference to Cattle and Sheep.**—*J. Amer. vet. med. Ass.* **92.** 495-502. [16 refs.]

Urinary calculi in cattle and sheep appear to be more prevalent during the winter, when the animals are receiving a diet mainly composed of roughage and likely to be deficient in vitamin A and to have a high phosphate content. It is said that any change of diet very often prevents the appearance of further cases.

—J. A. Nicholson.

Schirrmeister, E. (1938). Ein Beitrag zu Uebertragbarkeit der Geflügelleukose. [**Transmissibility of Avian Leucosis**].—*Berl. tierärztl. Wschr.* Feb. 11th. 81. [10 refs.]

Material from a tumour causing death in a turkey was injected into a rabbit, a g. pig and a chicken. The rabbit developed a leucocytosis and lymphocytosis after a week, the blood picture returning to normal two weeks later, and died of intercurrent disease four weeks after injection. The g. pig showed similar changes in the blood picture and was killed three months after injection. Neither animal showed any sign of leucosis at autopsy. In the chicken there was a leucocytosis and lymphocytosis which appeared for a time at intervals of a fortnight. The bird was killed and a tumour the size of a plum was found at the site of inoculation.

—Sassenhoff (Munich).

des Ligneris, M. (1938). **Fowl Sarcomata and the Tumour Problem.**—*S. Afr. med. J.* **12.** 67-70.

The transmission of the cottontail rabbit papilloma by cell-free filtrates has shown that at least one mammalian tumour could be transmitted in this way, as is the case with the fowl tumours. The author found that he could test the

neutralizing power of antisera against tumour filtrates accurately. Heating the serum at 56°C. for half an hour did not affect its inhibitory qualities, but heating for two hours diminished them. The inhibitory action of immune sera could not be shown *in vitro* when it was tested on actual tumour cells. The author is inclined to the view that cancer is ultimately a disease of intrinsic origin, the malignant change originating in the diseased cell.—E. M. Robinson.

Jackson, C. (1936). **The Incidence and Pathology of Tumours of Domesticated Animals in South Africa: A Study of the Onderstepoort Collection of Neoplasms with Special Reference to their Histopathology.**—*Onderstepoort J. vet. Sci.* **6.** No. 1. pp. 460. 187 figs. [250 refs.]

J. studied approximately 600 neoplasms encountered in South Africa among domesticated species, including fowls, and devoted special attention to the detailed histology and cytology and to problems of diagnosis, classification, and nomenclature.

Dealing with the more general features of neoplastic pathology, he made extensive observations on the nucleolar : nuclear ratios in the cells of various tumours, and found this ratio of great value in the assessment of malignancy. A rapid technique for the estimation of the n : N ratio is described. Evidence is presented in favour of the nucleolar origin of certain hyaline intranuclear " inclusion bodies " which were encountered in a variety of tumours. He believes that in certain avian tumours collagen may develop intracellularly, and discusses the bearing of this phenomenon on the theory of collagen formation in general.

The Onderstepoort collection contains examples of the following neoplasms not previously recorded for the species mentioned :– carcinoma of the small intestine and carcinoma of the pancreas in the sheep ; thymoma in the goat ; embryonal nephroma in the horse ; gliomata of the brain in the fowl ; heart-base tumours in the dog which are considered probably to be sympathogoniomata (neuroblastomata) ; multiple reticulo-endothelioma of the liver and spleen in the sheep ; myolipoma of the vagina of the bitch, and fibro-adenoma of the mammary gland in a male dog. Examples of tumours of rare occurrence include gland-cell carcinoma of the stomach in the horse, mammary carcinoma of the mule, cholangiocellular carcinomata of the liver of bovines, hepatocellular carcinoma of the liver of the fowl, lymphangiomata of the subcutis of the mule and of the pleura of the horse, lymphangiogenous endothelioma of the peritoneum of the ox, and mesiothelioma of the pericardium in the horse and of the peritoneum in bovines. The occurrence is recorded in fowls (on the tarso-metatarsus) and in sheep (on the scalp) of a type of epithelioma which combines the excessive keratinization of cornu cutaneum with the invasive growth of acanthoma.

The significance, diagnosis, and classification of certain cutaneous and apparently contagious tumours occurring very frequently among equines in South Africa are discussed. From histological and histogenetic study, as well as from clinical considerations, it is thought that these represent a one-sided development of lesions which in other species (dog and calf) constitute contagious papillomatosis. In early stages the lesions resembled papillomata, later the fibroblastic gained the ascendency over the epithelial proliferation and the lesion ulcerated. It is proposed to designate these lesions as equine sarcoids.

An important feature of the work is the new light which is thrown on the vexed question of the nature of the contagious venereal tumour (so-called transmissible lymphosarcoma) of dogs. Attention is drawn to the frequency with which these tumours occur at superficial sites remote from the genitalia ; but it is concluded that it is wrong to assign to these extragenital tumours a " spontaneous " origin,

there being evidence that the tumour may be transmitted by methods other than coitus, *e.g.*, by biting. J. believes that all cases of the disease arise through inoculation of cells derived from a pre-existing tumour of another individual. However, it is necessary to postulate that at some time in the past a spontaneous tumour arose, from the cells of which all subsequent tumours are directly descended. That such spontaneous tumours do occur in dogs is shown by the histological and cytological identity of certain primary neoplasms of the heart-base with the contagious tumours. The situation and cytology of these heart-base tumours favours their interpretation as neuroblastomata (sympathogoniomata) arising from the sympathetic ganglion which occurs in the posterior angle between the roots of the aorta and the pulmonary artery. Thus the contagious tumour is not a lymphosarcoma, but probably is a neuroblastoma.

Special chapters are devoted to :- epitheliomata ; carcinomata with special reference to carcinoma in fowls ; primary epithelial tumours of the liver ; mesothelioma ; connective-tissue tumours with special reference to the nature of the so-called mixed-cell sarcoma of fowls (histiocytic sarcoma) ; endothelial tumours with special reference to nomenclature, and the mixed neoplasms with special reference to their pathogenesis and classification. In all cases pains are taken to provide very detailed cytological descriptions with a view to extending, refining, and clarifying our diagnostic criteria.

In two appendices are summarized the species and organ incidence of animal tumours in South Africa, in so far as they are reflected in specimens submitted for examination over a period of fifteen years ; a third appendix provides a systematic catalogue and guide to the Onderstepoort collection. Features of the figures are the high incidence of equine sarcoids (37 % of equine specimens), thymoma of ruminants (4 % of bovine and 5 % of ovine tumour specimens), gland-cell carcinoma of sheep (28 %, exceeding acanthoma by 3 %), and basal-cell epithelioma of the dog (11 %).

NUTRITION IN RELATION TO DISEASE

GROENEWALD, J. W. (1937). **Animal Feeding in Relation to Diseases. I. Food Requirements of the Animal Body. II. Some Common Nutrition Debilities.** —*Fmg S. Afr.* **12.** 316-318 and 365-368. 3 figs.

I. A brief review of food constituents and minerals which are of importance in nutrition.

II. This is a general discussion on common nutritional debilities. Among the conditions dealt with under faulty feeding is winter cholera, in which severe diarrhoea or enteritis develops in animals kept on dry winter feed, with limited exercise over a considerable period, and then turned on to succulent pasture. Some harmful feeds are discussed, such as mouldy maize, prickly pear, ergot, and fodder containing cyanogenetic glucosides. The article goes on to consider the influence of diet on animal products, the preparation of feeds and feeding during fever, and other similar questions.—E. M. ROBINSON.

SMITH, W. K. (1938). **Failure of Alfalfa to Prevent the Hemorrhagic Sweetclover Disease.**—*Science.* **87.** 419. [5 refs.]

Poorly cured sweet clover hay may induce in bovines a disease characterized by a diminished clotting power of the blood, which appears to be due to a deficiency in prothrombin. Continued administration of the toxic diet results in severe, usually fatal, haemorrhage. Reference is made in this note to the studies of QUICK

[*V. B.* **8.** 471.], who suggests that alfalfa meal contains a factor, possibly vitamin K, which prevents the development of the disease in rabbits. S., however, states that he has found no indication that alfalfa exerts a protective action against sweet clover disease.—N. J. Scorgie.

Mellanby, E. (1938). **Nerve Degeneration and Bone Hypertrophy Induced in Young Animals by Diet.**—*J. Physiol.* **93.** 42P-43P. [5 refs.]

A short note on the relationship between degeneration of the eighth cranial nerve and bone overgrowth in the labyrinthine capsule of the ear of puppies fed on diets deficient in vitamin A. It is suggested that the bone overgrowth causes pressure on and stretching of the nerve, which results in the degeneration of the latter. Examination of the skull shows other bone abnormalities and bone overgrowth at the various foramina. The question remains to be decided whether all nerve degenerations produced on a vitamin A-deficient diet are due to bone overgrowth and the consequent pressure and stretching of the nerves.—N. J. S.

Elvehjem, C. A., Madden, R. J., Strong, F. M., & Woolley, D. W. (1937). **Relation of Nicotinic Acid and Nicotinic Acid Amide to Canine Black Tongue. [Correspondence].**—*J. Amer. chem. Soc.* **59.** 1767-1768. [See also *V. B.* **9.** 40].

During the progress of studies on the isolation of the antipellagra factor, two facts became evident. First, a commercial preparation of nicotinic acid proved highly effective in curing canine blacktongue. A single dose of 30 mg. gave a phenomenal response; the appetite improved immediately, the diarrhoea disappeared and the animal showed a growth response similar to that obtained on the original liver extract. Second, nicotinic acid amide, isolated from highly active concentrates by distillation and crystallization, also proved very active in the cure of the disease.—R. Allcroft.

I. Almquist, H. J., & Stokstad, E. L. R. (1937). **The Gizzard Factor of the Chick.**—*J. Nutrit.* **13.** 339-350. 1 fig., 4 tables. [12 refs.]

II. Almquist, H. J. (1937). **Sources and Nature of the Chick Gizzard Factor.** —*Ibid.* **14.** 241-245. 2 tables. [5 refs.]

I. In the course of experiments on haemorrhagic disease of chicks, gizzard erosions developed: these clearly had no aetiological connexion with the former because they were not curable by the same substances. In further work it appeared that the condition was not an avitaminosis, but that the preventive factor was easily destroyed by heat or by alcoholic potash, and readily absorbed by activated MgO from solution in hexane, and that it is present in fresh or dried greens and in wheat bran.

II. A's further experiments showed that the factor is present in the gizzard " lining " [? mucosa] itself, that it is fat soluble, and therefore cannot be identical with any member of the vitamin B complex, that it is unstable to heat and to ethyl alcohol, and that it has no noticeable effect on the growth rate of chicks.

Ansbacher, S. (1938). **New Observations on the Vitamin K Deficiency of the Chick.**—*Science.* **88.** 221. [3 refs.]

Vitamin K-deficient chicks, with the typical haemorrhagic diathesis, were fed 0·20 ml. of cod liver oil containing a vitamin K concentrate prepared from alfalfa. It was found that 1 mg. of the concentrate brought the blood-clotting time to normal in nearly all chicks within six hours, the effect lasting for 24 hours. The effect of 2 mg. lasted for more than 48 hours, that of 3·8 mg. for 72 hours.

Moreover, a relatively high amount of the concentrate reduced the clotting time to normal within 2½ hours.

A. claims that his observations offer a basis for a quantitative biological assay of vitamin K.

I. McNaught, K. J. (1938). **The Cobalt Content of North Island Pastures.** —*N.Z. J. Sci. Tech.* **20.** 14A-30A. 10 tables. [20 refs.]

II. Askew, H. O., Rigg, T., & Stanton, D. J. (1938). **Cobaltized Superphosphate.**—*Ibid.* 82A-89A. 3 tables. [4 refs.]

III. Askew, H. O. (1938). **Effect of pH Value on Solubility of Cobalt Phosphate.** —*Ibid.* 106A-109A. 1 fig. 1 table. [3 refs.]

IV. Taylor, C. R., & McNaught, K. J. (1938). **Top-Dressing with Cobalt. Experiments in Bush-Sick Country.**—*N. Z. J. Agric.* **57.** 206-210. 2 tables, 3 charts. [1 ref.]

V. Melrose, G. B., & McNaught, K. J. (1938). **Top-Dressing with Cobalt. Arohena Experiment.**—*Ibid.* 211-212. 2 figs., 1 table. [1 ref.]

I. This is another valuable chapter in the story of the part played by cobalt in animal nutrition. The author has evolved a method by which quantities of cobalt down to 0·00005 mg. or even lower can be measured, a great improvement on the unit of 0·01 mg., which was the smallest quantity that could be measured previously, by the best method available in 1933. A cobalt survey was made of pastures from widely separated areas in the North Island of New Zealand and the cobalt content correlated with the health of ruminants grazing on them. Pastures containing less than 0·04 p.p.m. cobalt on a dry matter basis induce " bush-sickness " in both sheep and cattle. Above 0·04 p.p.m., pastures are generally " sound " for cattle, and above 0·1 p.p.m. they are " sound " for sheep. Between 0·1 and 0·04 p.p.m. pastures may be either " sound " or " unsound " for sheep. [Unfortunately, a fairly large proportion of samples lie within this zone]. The author suggests 0·07 p.p.m. as the boundary between pastures " sound " and " unsound " for sheep, but the division is not a sharp one. This is due probably to the inaccuracies inherent in most pasture sampling methods.

II. The authors show that when 0·2% of cobalt is added to superphosphate, 80-90% of the cobalt is water soluble. When cobalt is added to other phosphatic manures its solubility depends on the pH value of the manure. Where the pH exceeds 6·0 the reduction in solubility is very marked.

III. It is shown that cobalt phosphate is readily soluble in aqueous solutions at pH 2·0, and that above pH 3·0 the solubility is closely correlated with the percentage of phosphate present as H_2PO_4 ion.

IV & V. Three experiments are described in which cobalt-deficient pastures were top-dressed with ½-2 lb. cobalt chloride per acre. In all three experiments both ewes and lambs grazing on cobalt-treated pastures throve considerably better than controls [although very small, badly-matched groups of ewes were used]. The cobalt content of treated pastures remained above 0·1 p.p.m. for five months. Top-dressing with limonite gave intermediate results, but on account of the large amount necessary the use of this material is relatively uneconomical.

—J. F. Filmer.

Underwood, E. J., & Elvehjem, C. A. (1938). **Is Cobalt of any Significance in the Treatment of Milk Anemia with Iron and Copper?**—*J. biol. Chem.* **124.** 419-424. 1 table. [9 refs.]

Anaemic rats were divided into three groups, one receiving milk *ad lib.* plus a daily addition of 0·05 mg. Cu, 0·02 mg. Mn, and 0·5 mg. Fe (Co-free), the second

a similar diet except that the iron was not freed from Co, and the third group the same diet as the first with addition of 0·1 mg. Co. There were no significant differences between the groups in respect of growth or of haemoglobin regeneration, and though the daily milk contained an average of 0·6γ Co it is concluded that the small amounts of Co contaminating iron salts play no significant part in the treatment of milk anaemia in the rat. The possible Co requirement of the rat is discussed, and from the present data appears to be less than 0·6γ Co.—ALFRED EDEN.

PUBLIC HEALTH

THOMAS, S. B., & HOBSON, Phyllis M. (1938). **The Routine Bacteriological Examination of Accredited Milk.**—*Welsh J. Agric.* **14.** 247-260. 12 tables. [14 refs.]

The rapid increase in the production of Accredited Milk in Wales since 1935 is discussed and explained, and the methods of sampling and examining such milk for bacterial standard are dealt with in detail. The importance of careful sterilization of dairy utensils is illustrated and it is noted that in those counties where steam-sterilization of utensils is compulsory the percentage of samples falling below standard is only half that of samples from counties where it is voluntary.

A critical comparison is made of the methylene blue test, the coliform test and the plate count as indicators of the bacterial standard of milk samples. It is concluded that the methylene blue test, augmented by the coliform test, constitutes a reasonably accurate means of assessing the bacterial standard of samples of Accredited Milk.

It is noted that samples fall below the bacterial standard chiefly in summer, and more especially in August, due probably to inefficient cooling immediately after production, and to inefficient sterilization of utensils. Bacterial standards are suggested for milks of grades higher than that of Accredited Milk examined by methylene blue and coliform tests. The influence of appropriate education of the producer upon the quality of milk from his farm is illustrated.—H. BURROW.

BOURGEOIS, G. (1938). Le contrôle hygiénique du lait à Dijon. **[Milk Control in Dijon].**—*Lait.* **18.** 648-666.

This is an account of past conditions relating to milk production and distribution in the city of Dijon. The improvements which have gradually been brought about, mainly by the periodical introduction of municipal laws, are traced up to date. In 1938 a further set of regulations was issued, but B. concludes with an indication that there is still progress to be made. A copy of the municipal control laws governing milk production and distribution in Dijon is appended.—H. E. B.

DAVIS, D. J. (1938). **Public Health Aspects of Mastitis.**—*J. Amer. vet. med. Ass.* **93.** 19-20.

A general statement of the position, with no new information.—H. BURROW.

I. GILCREAS, F. W., & DAVIS, W. S. (1937). **The Practical Value of the Phosphatase Test in Determining the Efficiency of Pasteurization.**—*Proc. int. Ass. Milk Dlrs. 1937.* pp. 34-56. 11 tables, 2 diagrams. [7 refs.]

II. VON DOHLEN TIEDEMAN, W., & HOHL, N. J. (1938). **Improved Laboratory Control of Pasteurized Milk.**—*Amer. J. publ. Hlth.* **28.** 629-632. [10 refs.

III. FUCHS, A. W. (1938). **Contamination of Pasteurized Milk by Improper Relative Pressures in Regenerators.**—*Publ. Hlth Rep., Wash.* **53.** 496-505. 6 figs.

IV. Slanetz, L. W. (1938). **Prevalence and Classification of Hemolytic Streptococci in Pasteurized Milk.**—*Tech. Bull. N.H. agric. Exp. Sta.* No. 70. pp. 12. 1 fig., 2 tables. [16 refs.]

V. Savage, W. (1938). **Milk and Pasteurization.**—*J. R. sanit. Inst.* **59.** 1-11. 1 table. [10 refs.]

VI. Macgregor, A. S. M. (1938). **The Milk Supply.**—*Edinb. med. J.* **45.** 363-367.

I. This paper provides further evidence of the sensitivity and reliability of the phosphatase test for detecting inefficient pasteurization. Variations in the temperature employed, variations of five minutes or longer in the heating time, and the addition of 0·1% or more of raw milk are readily detectable. Many interesting observations on the carrying out of the test are also made.

II. Standard plate counts are considered useless for the laboratory control of pasteurized milk. The best index of the safety and cleanliness of such milk is to be obtained by subjecting surprise samples to :- (a) the phosphatase test to determine proper pasteurization ; (b) the coliform test to determine possible contamination after pasteurization, and (c) a direct microscopic count as an indicator of the presence of thermophilic bacteria and contamination after pasteurization.

III. In pasteurization embodying the milk to milk, or milk to water to milk principles of preliminary heating of raw milk by hot milk just after it has been heat-treated, flaws in the piping or joints may lead to contamination of heated by raw milk. To prevent this it is necessary for the raw milk to be pumped at a lower pressure than the heated milk. Methods are described to enable officials to determine whether the required relative pressures are being used.

IV. It is shown that the weakly haemolytic streptococci so prevalent in pasteurized milk enter the milk at the farm from utensils inefficiently cleaned and sterilized. None were present in milk samples taken aseptically from cows. Samples of raw milk from ten of the 15 farms studied revealed these streptococci. They are particularly heat-resistant, and resist pasteurization temperatures.

Sixty strains of these streptococci were examined. They produce *alpha* prime type colonies on blood agar, and are classified as *Str. bovis* var. A, B, C, or D or as *Str. faecalis*. None of the organisms isolated reacted with any of Lancefield's sera.

V. The provision of a cheap, clean, and safe milk supply is essential, and as much in the interests of the producers as of the public. S. states that he has no bias in favour of pasteurization if these aims can be achieved in any other way. Existing measures involving designated standards of milk, routine clinical veterinary inspection, and the sampling of milk, although desirable, can, he asserts, never make the ordinary milk supply safe. Pasteurization on the other hand, when efficiently carried out, destroys all the pathogenic organisms which may spread disease from milk, leads to no significant change in its nutritive value, and is also a practical proposition.

VI. M. contends that, in large centres of population, it is an unsound plan to exempt from compulsory pasteurization the milk from T.T. herds. His reasons are that the risk of transmitting disease by bulk milk is too great, and that milk from T.T. herds is only safe as regards tuberculosis infection. Finally, it is difficult to keep even safe milk wholesome, particularly during the summer months when it has to be conveyed long distances.—Gwilym O. Davies.

Blanchard, C. K. (1937). **Septic Sore Throat —Another Reason for Pasteurization.**—*Publ. Hlth News, Trenton, N. J.* **21.** 3-8. [Copied *verbatim* from *Bull. Hyg , Lond.* **13.** 224-225. Signed C. R. Jones].

A survey of milk-borne epidemics in New Jersey during the last 27 years

shows that in this period, there was 58 outbreaks, in which contaminated milk was the vector of infection and in all but one the milk was raw. Three recent outbreaks of septic sore throat have occurred in communities where raw milk is still used, and since this disease was not spread by milk until three years ago, it seems that these outbreaks give further evidence for requiring universal pasteurization.

The first outbreak occurred in 1933 and within 30 days from the first recognized case, there were 131 typical cases with two deaths in a town of 2,700. Study revealed that 82 per cent. of these cases were users of a local supply of raw milk. The other cases were presumably contact cases.

Six of the 16 cows producing this supply of milk had infected udders. Pus and streptococci were found in the fore milk. A milker at this dairy had had septic sore throat shortly before epidemic. It may be supposed that he had infected the cows.

A year later a second outbreak in this same community was traced to another dairy supplying raw milk. In both cases the epidemics abruptly terminated when pasteurization was required.

A third outbreak, involving one hundred and seventy-five persons with seven deaths was immediately traced to the raw milk supply used. In this case there was a milk supply of 450 quarts used per day. One third of this supply was pasteurized while the remaining two thirds was delivered raw. The victims of the epidemic cited were among the consumers of the raw milk. Not one consumer of the pasteurized portion of the milk supply contracted the disease. When the entire portion of the supply was pasteurized the epidemic ceased.

PULLINGER, E. J., & KEMP, Audrey E. (1938). **Growth of *Salmonella typhi* and certain other Members of the *Salmonella* Group in Milk and Butter Stored at Atmospheric Temperatures.**—*J. Hyg., Camb.* **38.** 587-595. 6 tables, 1 diagram. [8 refs.]

The question whether certain members of the genus *Salmonella* can multiply in milk and butter stored at atmospheric temperatures was studied. *S.t.*, *S. paratyphi* A, *S. paratyphi* B, *S. cholerae-suis*, *S. typhi-murium*, var. *dublin*, and *S. bovis morbificans* were examined, as these species have been associated with milk-borne epidemics. They all multiplied readily even at 15°C., and from this it is concluded that, whether the primary contamination of milk arises from the cow as with *S.t.-m.*, var. *dublin*, or from a human carrier as with *S.t.*, the important factor in the development of an epidemic is the ability of these organisms to multiply during storage. These organisms did not multiply in butter similarly stored, and actually died out gradually, but viable organisms were present for many weeks.

HENNING, M. W. (1938). **Calf's Meat as a Cause of Paratyphoid in Natives.**—*S. Afr. med. J.* **12.** 55-56. 1 table. [9 refs.]

Attention is drawn to an outbreak of acute food poisoning in ten natives who had eaten the flesh of a calf with paratyphoid infection. *Salmonella enteritidis* var. *dublin* was isolated from the blood of one native who died. In spite of the wide distribution of calf paratyphoid in South Africa, food poisoning outbreaks as a result of eating the flesh of infected calves are rare.—E. M. ROBINSON.

LAWRENCE, W. A. (1938). **One Hundred Per Cent Meat Inspection.**—*J. Amer. vet. med. Ass.* **92.** 527-531.

The federal meat inspection service exercises control only over meat intended for inter-state trade, *viz*, about 65% of the meat and meat products consumed in

the U.S.A. Of the remaining 35% haphazard inspections are generally made of 5% by veterinarians, and of 8% by lay inspectors under veterinary supervision, and the rest is not inspected at all. In one State 95% of the meat intended for consumption within that state is not examined. Only one State maintains an efficient systematic meat inspection service.

The desirability of establishing an efficient service to cover all meat and meat products and the measures to bring this into effect are discussed.—H. E. BYWATER.

ZEETTI, R. (1937). Ricerche batteriologiche sulla putrefazione della carne. [**Bacteriological Observations on the Putrefaction of Meat**].—*G. Batt. Immun.* **19.** 441-470. 11 figs. [Numerous refs.] [English summary]. [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 139. Signed G. S. WILSON].

Samples of meat from cattle were taken at the slaughterhouse, brought to the laboratory, and incubated under aerobic or anaerobic conditions at temperatures between 0° and 60°C.—usually 18°-22°C. Bacteriological examinations were made at intervals, the types of organisms present were studied, and the rate at which putrefaction advanced was measured. As might be expected, numerous different organisms were found, and there was a tendency for different sets of organisms to be associated with different stages of putrefaction. Observations showed that the bacterial invasion of the meat occurred along the connective tissue between the muscle bundles : the muscle fibres themselves were not invaded till later.

MINETT, F. C. (1938). **Experiments on *Staphylococcus* Food Poisoning.**—*J. Hyg., Camb.* **38.** 623-637. 2 tables.

The importance of staphylococci as a cause of food poisoning in man is now clearly established, the poisoning being due to the formation in the food of a product which for convenience may be referred to as enterotoxin. For demonstrating this product, feeding tests on monkeys (*Macacus rhesus*) have been recommended, but M., in common with some other authors, has shown that these animals are unsatisfactory owing to their variable susceptibllity, and the same is true of dogs and cats. DOLMAN [p. 63.] found that kittens were highly susceptible to enterotoxin ; these animals react with symptoms of vomiting and diarrhoea after intraperitoneal injection of the product. This was confirmed by M. in the course of work involving the use of more than 300 kittens. Enterotoxin was formed by :– (a) 16 out of 38 strains of *Staph. aureus*, isolated from cases of acute or chronic mastitis or from normal udder milk, and (b) four out of five strains of *Bacterium coli*, mostly from calves with " white scours ". No enterotoxin was obtained from 15 strains of *Streptococcus agalactiae* from mastitis in cows.

The formation of enterotoxin under natural conditions was observed :–

(a) In udder milk seeded with *Staph. aureus* or naturally contaminated with that organism and stored at atmospheric temperatures (18° and 22°C.) ; under these conditions enterotoxin formation is associated with a vast increase in the number of staphylococci and sometimes with the development of a " malty " flavour in the milk. The substance remains active in cheese prepared from such milk.

(b) In layer cake made with cream naturally contaminated with *Staph. aureus*.

A small outbreak of poisoning due to potted meat paste was shown to be caused by a non-haemolytic staphylococcus.

A few feeding experiments on human beings with milk or cream in which food-poisoning staphylococci had grown were negative, but on one occasion a staphylococcus from a case of mastitis yielded a culture filtrate which caused symptoms of food poisoning in a human volunteer.

Enterotoxin has the following properties :– It is resistant to heat (95°C. for 30 minutes), to low concentrations of formalin sufficient to destroy the haemolytic toxin, to acid (pH 5·0) and to rennet, but is destroyed by trypsin. It diffuses freely into the culture medium, but only slightly through collodion. It is antigenic. Its properties are such that enterotoxin can be classed as a bacterial exotoxin.

THERAPEUTICS

ANON. (1938). **Chemotherapy of Meningitis.**—*Lancet.* **234.** 733-734. [7 refs.]

Much success has resulted from the use of sulphanilamide in the treatment of streptococcal meningitis in man. An adequate concentration in the blood as early as possible is essential, maintained by repetition at four-hourly intervals until improvement occurs. Intrathecal administration has also been recommended. Further knowledge is required on the rapidity and extent of the passage of sulphanilamide into the cerebrospinal fluid.—ALFRED EDEN.

GETZ, H. R. (1938). **Cod Liver Oil Therapy in Experimental Tuberculosis.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 543-545. 1 fig. [4 refs.]

The work recorded here shows that cod liver oil promotes healing of tuberculous ulcers in the skin of g. pigs, whether applied locally or given by intramuscular or subcutaneous injection.

It is also shown that the healing factor is contained in the vitamin fraction, and that it is not vitamin A or vitamin D.—W. J. IRONSIDE.

I. LEVADITI, C., & REINIÉ, L. (1938). Chimiothérapie de l'infection déterminée chez la souris et la poule par la *Pasteurella avicida.* [**The Chemotherapy of *Past. aviseptica* Infection**].—*C. R. Soc. Biol. Paris.* **127.** 1179-1180. 1 table. [1 ref.]

II. LEVADITI, C., & VAISMAN, A. (1938). Chimiothérapie antiendotoxique. Endotoxine de la *Pasteurella avicida.* [**The Endotoxin of *Past. aviseptica***]. —*Ibid.* **128.** 283-285.

I. The authors describe the therapeutic effect of oral administration of five benzene-sulphur derivatives on 90 mice and 23 fowls inoculated with lethal doses of live *Past. aviseptica.* In their opinion, all five derivatives possess a certain degree of therapeutic activity, which is, however, very slight compared with that exerted in streptococcal infections.

II. Several series of ten mice were injected (intraperit.) with 2-5 mg. of the endotoxin of *Past. aviseptica*, and adequate doses of benzene-sulphur derivatives were simultaneously administered *per os.* The authors found that p-aminophenylsulphamide possessed anti-endotoxic properties *in vivo*, and that surviving mice were refractory to intraperitoneal injection of live bacilli.—R. O. MUIR.

PIGOURY, L. (1938). Reviviscence de lésions cutanées ou ecthyma stibié au cours du traitement de la leishmaniose canine par les antimoniaux. [**Reappearance of Cutaneous Lesions during Antimony Treatment of Canine Leishmaniasis**]. —*C. R. Soc. Biol. Paris.* **127.** 105-108. [4 refs.]

Two " clean " dogs were injected (intramusc.) every 2nd day with 1-3 c.c. of a solution of lithium antimonio-thiomalate. In both, a pustular dermatitis developed along the abdomen and inside the thighs after the ninth injection. The cutaneous pustules healed within a week, while injections were being continued. P. deduces from these results that the transitory reappearance of lesions in dogs, during

treatment for general leishmaniasis by antimony therapy, is a sign of antimony intoxication, not a spontaneous symptom of the disease.—R. O. Muir.

Jakimov, V. L., [Yakimoff, W. L.] & Rastegaeva, E. F. [Rastegaieff, E. F.] (1937). K voprosu o lečenii kokcidioza krolikov. [**Treatment of Coccidiosis in Rabbits**].—*Sborn. Rab. Leningrad. vet. Inst. 1937.* pp. 145-154. 2 tables. [German summary].

The following were tested for their efficacy in the treatment of coccidiosis in rabbits :– silver compounds—ichthargan, argochrom, albargin, protargol, argoflavin, lyargol, " silbernovoarsolan " ; bismuth compounds—" bismuthoqui ", " byechinol " and " birathyl " ; alkaloids—enchinin and aristochin ; anthelmintics —" distol ", " serapis ", " neoserapis ", filmaron, " igitol " and " Dr. Sprehn's capsules ", and various other substances (" coccidol ", urotropine, taningen, " ventrase ", " adsorgan ", and whey).

Good results were obtained with the following, given in order of efficacy :– albargin, ichthargan, ichthargan with methylene blue (this, however, caused great loss of weight, and two deaths from exhaustion), all the other silver compounds, and chinosol, " cresolin ", and methylene blue, the three latter having been tested in a previous experiment. The other substances tested gave negative results.

Legg, J. (1936). **The Treatment of Piroplasmosis (P. Bigeminum) with Akiron.**—*Aust. vet. J.* **12.** 227-230. [5 refs.]

L. inoculated two non-splenectomized bulls and three splenectomized steers with *Babesia bigemina*. When the animals showed an acute reaction they were inoculated intravenously with 4·5 or 5 ml. of a 5% solution of akiron. This resulted in a rapid reduction of the number of parasites, a fall in temperature, and recovery. The three splenectomized animals were later inoculated with 5 ml. of citrated blood containing *B.b.* ; two of them required therapeutic treatment, and piroblue was given. The doses of akiron used had caused complete destruction of the blood parasites, so that no premunition resulted.—T. S. Gregory.

I. Craufurd-Benson, H. J. (1938). **An Improved Method for Testing Liquid Contact Insecticides in the Laboratory.**—*Bull. ent. Res.* **29.** 41-56. 7 figs., 14 tables. [15 refs.]

II. McGovran, E. R., & Ellisor, L. O. (1936). **Repellency of Pine-Tar Oil to Wound-Infesting Blowflies.**—*J. econ. Ent.* **29.** 980-983. [2 refs.]

III. McGovran, E. R. (1937). **Insecticides to Control Blowfly Larvae in Wounds.**—*Ibid.* **30.** 876-879. [5 refs.]

I. The method consists essentially in the immersion of insects in insecticide solutions, and the technique is fully described. It is shown that any variation in technique gives variation in results and suggested that by strict observance of the technique described, identical results may be obtained by different workers.

II. Pine tar oil (S.G.1065) was applied to wounds in sheep and goats at intervals of 1-5 days. Daily application was found to be definitely the most effective method.

III. Agents found to be effective were methyl thiocyanate in 2% solution in soluble pine tar oil, nicotine 95% in 2% solution in soluble pine tar oil, and benzol. Treatment consisted in filling the wounds with the solutions and of holding the animals for about 35 seconds. In the case of benzol the opening of the wound was plugged.—W. J. Ironside.

KRAFT, E. (1937). Beitrag zur Bekämpfung der Wurmkrankheiten der Pferde. **[Control of Worms in Horses].**—*Dtsch. tierärztl. Wschr.* **45.** 641-643.

A record of trials of two new anthelmintics," strongylon " (organic arsenic preparation) and " Ciff capsules " (containing CCl_4, arsenious acid and an anthraquinone purgative), both prepared by A.G. Farbenindustrie. Ninety-three horses infested with strongyles were treated with " strongylon ", and 50 infested with strongyles and ascarids were given " stronylon " followed by " Ciff capsules ". The former was very effective against strongyles only, and ascarids were killed by " Ciff capsules ".—J. E.

DAVIS, H. P., & HATHAWAY, I. L. (1936). **The Effect of Sprouted Oats in Reproduction of Dairy Cattle.**—*J. Dairy Sci.* **19.** 439-440.

In view of the suggestion that delayed pregnancy in cattle is due to a vitamin deficiency, observations were carried out, with suitable controls, on groups of cattle of various breeds, sprouted oats having been added to their daily ration.

The authors found that such oats had no marked effect upon the reproductive function of heifers, cows or bulls as measured by the number of services required for conception.—H. V. HUGHES.

BARDENS, G. W. (1938). **Treatment of Infectious Keratitis with Mercurochrome.**—*J. Amer. vet. med. Ass.* **93.** 35-36. [5 refs.]

Excellent results are recorded in the treatment of this condition in cattle with " keratitis mixed bacterins " [a commercial vaccine, the composition of which is not given] assisted by local applications of mercurochrome.—D. D. OGILVIE.

FORBES, J. C. (1938). **Studies on the Prevention of Liver Cirrhosis by the Subcutaneous Injection of a Liver Preparation.**—*J. biol. Chem.* **123.** xxxvii-xxxviii. [2 refs.]

F. describes experiments carried out to determine whether a liver preparation would protect rats against liver cirrhosis due to chronic carbon tetrachloride poisoning. He found that if 100 mg. per 100 g. body weight of the preparation was injected subcutaneously 18-24 hours before each poisoning, there was no severe liver damage, although marked cirrhosis was observed in the livers of the controls. Doses of 50 mg. per 100 g. body weight did not prevent moderate cirrhosis, but the more severely damaged livers of the controls indicated that even this dose afforded some protection.

I. STRONG, L. C. (1938). **The Liquefaction of Spontaneous Tumors of the Mammary Gland in Mice by Heptyl Aldehyde.**—*Science.* **87.** 144-145. [3 refs.]

II. STRONG, L. C., & WHITNEY, L. F. (1938). **The Treatment of Spontaneous Tumors in Dogs by the Injection of Heptyl Aldehyde.**—*Ibid.* **88.** 111-112. [1 ref.]

I. Twenty-five mice with spontaneous mammary tumours were placed on a diet containing heptyl aldehyde [no details of dosage] and in all of them liquefaction of the tumours occurred, leading to complete regression in six cases. The tumours of 120 control cases did not change.

II. The authors applied the principle mentioned above to ten dogs with benign tumours, by injecting heptyl aldehyde in doses of from 0·1 c.c. to 1 c.c. into and/or remote from the tumour. In every case the tumours softened, and in some cases they disappeared entirely, while at the same time the dogs improved remarkably in health, and increased in weight. [Mention is made of the draining

away of the fluid resulting from the softening process, but it is not stated whether this is necessary in every case]. The work is being continued.—J. E.

POISONS AND POISONING

SEDDON, H. R. (1937). **Poison Plants in Australia.**—*J. comp. Path.* **50.** 307-311.

The seriousness of losses due to poisonous plants in Australia is due to :– (1) the many species of toxic plants present in the natural vegetation, and (2) the extent to which stock are driven from one part of the country to another. The poison plants include :– (a) native plants, many of which are cyanogenetic, and (b) introduced plants: (c) includes cyanogenetic fodder plants (sorghum and sudan grass), accidentally introduced weeds which may lead to a form of staggers (which is accentuated by the common practice of droving), and introduced garden, plants to which animals commonly gain access.—ALFRED EDEN.

STEYN, D. G. (1936). **Differential Diagnosis in Plant Poisoning.**—*J. S. Afr. vet. med. Ass.* **7.** 226-237.

In this very comprehensive but condensed article a great deal of information is given on the differential diagnosis of plant poisoning in South Africa. The subject is discussed under the following headings :– (a) sudden deaths, (b) pathognomonic symptoms, and (c) toxic agents and diseases with similar symptoms. —E. M. ROBINSON.

RIMINGTON, C., & ROETS, G. C. S. (1937). **Chemical Investigation of the Plant *Acalypha indica*. Isolation of Triacetonamine, a Cyanogenetic Glucoside and Quebrachite.**—*Onderstepoort J. vet. Sci.* **9.** 193-201. 5 figs., 2 tables. [4 refs.]

The plant *A.i.* is cyanogenetic, containing approximately 270 mg. HCN per 100 g. dry weight of the dried, powdered material.

A base is present in extracts of the plant, being derived from some precursor—possibly the glucoside itself. This base has been identified as triacetonamine, of which the picrate (M.P. 196°C.) and 2 : 4 dinitrophenylhydrazone have been prepared and described. Quebrachite, 1-inositol monomethyl ether, has also been isolated from the plant.

The cyanogenetic glucoside appears to crystallize in two forms, *viz*, thin hexagonal plates (M.P. 182-4°C.) and fine silky needles (M.P. 108°C.). The molecular formula $C_{14}H_{20(22)}N_2O_{10}$ is suggested. It yields basic material on hydrolysis. From an acid hydrolysate of the glucoside, tested with Brady's reagent, acetic acid 2 : 4 dinitrophenylhydrazide has been isolated. The possibility of the presence in the molecule of an N-acetyl group is indicated.

STEYN, D. G. (1937). **Experiments with Plants Alleged to be used as Abortifacients and Ecbolics by Natives.**—*Onderstepoort J. vet. Sci.* **9.** 107-109. [2 refs.]

S. ascertained the effects of *Momordica foetida*, *Leonotis americana*, and *Abutilon indicum* upon rabbits in a state of advanced pregnancy. The results indicated that the plants were non-toxic to rabbits and not liable to cause abortion. It should, however, be mentioned that the experiments were of necessity conducted with dry, and not fresh, plant material.

PHYSIOLOGY

VanLandingham, A. H., Henderson, H. O., & Bowling, G. A. (1935-1936). **Studies on the Chemical Composition of the Blood of Dairy Cattle. I. The Effect of Age and Phosphorus Intake on the Calcium and Inorganic Phosphorus Content of Whole Blood of Dairy Heifers. II. The Effect of Phosphorus Intake upon the Calcium and Inorganic Phosphorus Content of Whole Blood of Dairy Heifers during the Period of First Gestation and Lactation.**—*J. Dairy. Sci.* **18.** 557-572, and **19.** 597-609. 3 figs., 8 tables. [Numerous refs.]

I. Three groups of growing heifers were fed on rations equal in content of total digestible nutrients including protein, one group receiving a normal ration and the others a low P ration. Composite blood samples were made monthly from each group and analysed for total Ca and inorganic P. Normal animals showed a slight increase in blood inorganic P from the second to the fourth month, a constant level until the tenth month, and thereafter a gradual decline with age. Low P rations led to an immediate lowering of blood inorganic P, preceding by several weeks the physical symptoms of P deficiency which include anorhexia, stiffness in fore- and hind-quarters, and emaciation. The P requirements of growing animals depend largely upon the rate of skeletal growth, 3·8 g. P per 100 lb. live weight being adequate to maintain normal blood inorganic P up to 25 months of age, whilst one-third this quantity is insufficient. The Ca content of the blood was unaffected by age or by level of P intake.

II. Two groups of heifers were fed on rations equal in respect of total digestible nutrients in proportion to body weight, but respectively normal and low in P. Composite samples of whole blood were analysed periodically for inorganic P and Ca contents. There was a decided drop in the blood inorganic P at or just after parturition, more pronounced in the low P group. Milk production associated with low P intake also led to a lowering of the blood inorganic P. In the period of first gestation an average intake of 1·2 g. P per 100 lb. body weight was sufficient to maintain the inorganic P at the normal level, but during lactation heifers giving 2-3 gallons of milk daily required 0·9-1 g. P per 100 lb. live weight in the food above that in the milk to maintain the normal blood in organic P level. Gestation, lactation and lowered P intake had no appreciable effect on the whole blood Ca level.—Alfred Eden.

Hawkins, W. B., & Whipple, G. H. (1938). **The Life Cycle of the Red Blood Cell in the Dog.**—*Amer. J. Physiol.* **122.** 418-427. 2 tables, 4 charts. [17 refs.]

A method is described for estimating the length of the life-cycle of the red blood cell in the dog. A dog having a bile fistula, and in its normal state of health, weight equilibrium, appetite and activity, is the subject of weekly, haemoglobin determinations and daily analyses of bile pigment elimination. Anaemia is produced by injection of acetyl phenyl hydrazine or by bleeding, and a mass of new red cells enters the circulation. The bile pigment output falls for several weeks, but later, as the new red cells become obsolete, the output rises. In four dogs the period elapsing between the mid-point in the curve of the time of most active haemoglobin regeneration and the time when bile pigment output was greatest (*i.e.*, the estimated length of the life-cycle of red blood cells) averaged 124 days. On the basis of the figures obtained, the estimated output of bile pigment averaged 83 mg. per day, and the actual observed output, 85 mg. per day.—H. V. Hughes.

Cordier, G., & Ménager, J. (1938). La variabilité de la sédimentation des globules rouges chez les équidés. [**Variations in the Sedimentation Rate of Red Blood Cells in Equines**].—*Rec. Méd. vét.* **114.** 97-104. [1 ref.]

With a view to assisting in the diagnosis of an enzootic of suspected equine infectious anaemia, observations were made upon the variations in the rate of sedimentation of red blood corpuscles in horses, donkeys and mules. The test did not prove of any value in diagnosis, and the authors consider that such tests and interpretations of observations upon them can only be accepted with considerable reserve. The rates of sedimentation in cases of equine influenza resembled the rates in cases of E.I.A. A difference of 1 or 2 mm. in the diameter of the test tubes had a considerable effect on the rate of sedimentation. Samples of blood from the two jugular veins, taken simultaneously, differed in the rate of sedimentation [see also *V. B.* **5.** 555, and **8.** 507 and 670].—H. V. Hughes.

Warbritton, Virgene, McKenzie, F. F., Berliner, V., & Andrews, F. N. (1937). **Sperm Survival in the Genital Tract of the Ewe.**—*Proc. Amer. Soc. Anim. Prod. 1937.* pp. 142-145. 1 table.

The authors killed 34 ewes which had been inseminated, artificially or naturally, approximately 2, 12, or 22 hours beforehand. Sections of the genital tracts were examined for pH of secretions and for number and normality of sperm present. In the fallopian tubes normal sperm were most numerous, on the average, in ewes which had been inseminated 12 hours previously. Abnormal sperm were relatively most numerous in ewes inseminated 2 hours previously and least numerous in those inseminated 22 hours previously.

The average number of abnormal sperm per thousand was 381 in the tubes and 277 in the uterine horns.

Sperm were best preserved and most constant in numbers in the cervix, which was usually the most acid section of the tract, though the pH was always within the range of normal semen. The vagina was usually the most alkaline section unless insemination had occurred 19-22 hours previously. Acidity in this region developed in relation to the disappearance of the sperm, and not in relation to the termination of oestrus.

The authors conclude that, of the three periods examined, 12 hours before ovulation is the most suitable time for insemination. For many ewes this would mean mating 10-18 hours after the beginning of oestrus.—J. G. Murray.

Dodds, E. C. (1937). **The Theoretical and Practical Significance of Endocrinology.**—*J. R. Inst. publ. Hlth Hyg.* **1.** 135-153. [Numerous refs.]

D. gives an account of the action and, in some instances, the constitution of the hormones of the pituitary, the ovary, testis and suprarenal glands.

The results of experiments here described suggest that the posterior lobe of the pituitary is essential to digestion, producing a secretion which maintains the capillaries of the alimentary tract in a constant state of partial contraction, in which state they are able to dilate in response to a stimulus and thus bring about alimentary secretion.

He points out that hormones should not be regarded as substances which can be administered in the same manner as can single drugs. For example, in order to produce satisfactory results, the hormones oestriol and progesterone must be used together in a way which will imitate their natural production from the ripening Graafian follicle.—H. V. Hughes.

PIERRE. (1938). Endocrinologie thyroïdienne. **[The Thyroid Gland and Its Disorders].**—*Rev. Méd. vét., Toulouse.* **90.** 305-322.

A general account of the functions of the thyroid gland, including a discussion of the effects of hypo- and hyperthyroidism. No new work is referred to. —J. A. NICHOLSON.

VENZKE, W. G. (1938). **Endocrines and their Role in Reproduction.**—*J. Amer. vet. med. Ass.* **92.** 663-680. [Numerous refs.]

A summary of the present knowledge on the control of reproduction by the endocrine substances, together with a short discussion of the possibility of extending the use of the latter in practice.—J. G. MURRAY.

SIMONNET, H. (1937-1938). Les hormones sexuelles. (I & II). **[Sex Hormones. I & II].**—*Rev. Path. comp.* **37.** 1118-1132, and **38.** 445-459. [Num. refs.]

I. The chemical structure of testosterone and other androgenic substances, of oestradiol and other oestrogenic substances, and of progesterone and related substances, is described, and their possible derivation from cholesterol discussed. S. describes several other substances which have oestrogenic properties, even though they do not contain the phenanthrene nucleus, and refers to the possibility that the natural oestrogen, oestradiol, is decomposed in the body and produces a substance which contains the diphenyl group.

II. There is strong evidence that progesterone is the actual hormone of the corpus luteum, oestradiol the ovarian hormone, and testosterone the male hormone, and S. discusses their action and specificity. Oestrogens are excreted in the male and are found in the testes in some species. Androgens are excreted in the female and are found in the ovary. Some androgens produce oestrous changes in the female, including growth of the uterus, and even progestational development of the endometrium, as brought about by the luteal hormone. Oestrogens produce certain changes in the male, including development of the muscle of the vesiculae. Certain substances (*e.g.*, androstenediol) have both oestrogenic and androgenic actions. Some pathological changes produced by the sex hormones in the prostate, especially by oestrogens, are reviewed, and some of the clinical uses of the hormones discussed.—J. M. ROBSON.

MCKENZIE, F. F., & ANDREWS, F. (1937). **Estrus and Ovulation in the Mare. (A Preliminary Report).**—*Proc. Amer. Soc. Anim. Prod. 1937.* pp. 64-70.

The psychological and physiological phenomena exhibited by 46 mares throughout the foaling and breeding season between April 16th and July 10th, 1937 are noted.

The authors found the average length of oestrus to be 5·54 days, with a range of 1-27 days. The average mare passed out of heat 0·86 of a day after a corpus luteum could be detected. The average length of di-oestrus was 15·26 days, with a range of 6-29 days, 82% falling within the period of 13-17 days inclusive. The interval between parturition and the first oestrus ranged between 2 and 12 days, with a mean of 7·25 days.

In general, the follicle was tense and firm the first day of oestrus and as development continued it stood out prominently and was often so firm to touch that it seemed solid. Shortly before ovulation the follicle became more fluctuating. During the first and second days following ovulation the corpus luteum increased in firmness and could be detected by palpation. As the inter-oestral period progressed it became more difficult to detect the corpus luteum with certainty.

The average size of follicles was estimated at 2·7 cm. on the first day of oestrus

and 3·2-3·8 cm. on the day of ovulation. Mares with heat periods longer than the average tended to develop larger follicles, the average on the seventh day being 4 cm. and on the eighth day, 5 cm. Ovulation was found on an average to occur 4·86 days after the onset of oestrus, the range being from one to 11 days.

The pH of cervix and vagina was found to vary within a range of 7·2-8·5 during the oestral cycle ; the cervical secretion was nearly always less alkaline than the vaginal, but both were definitely alkaline. The highest readings were found just prior to ovulation and the lowest seven days after oestrus.—J. G. MURRAY.

CORNER, G. W. (1938). **The Sites of Formation of Estrogenic Substances in the Animal Body.**—*Physiol. Rev.* **18.** 154-172. 2 figs. [Numerous refs.]

Research done over the last twenty years, though not providing definite proof, indicates strongly that the usual site of production of the oestrogenic hormone is the theca interna of the Graafian follicle. Hormone production probably begins when the follicle is small and continues as it grows larger.

It has been shown that oestrogenic substance is produced by the corpus luteum, though the functional significance of this production is still a matter of conjecture. Evidence is accumulating to show that a certain amount of oestrin is required to support the corpus luteum and, in view of the commonly-assumed suppressive action of the corpus luteum on follicular growth, it may be that the production of oestrogenic hormone by the corpus luteum is a means of providing against its own premature decay through lack of oestrin.

From the observations of many workers it is certain that an extra-ovarian source of the oestrogen in placenta, blood, and urine during pregnancy must be postulated. That this source is the placenta itself is the best hypothesis, but certain other possibilities remain to be excluded.—J. G. MURRAY.

COLE, H. H. (1938). **High Gonadotropic Hormone Concentration in Pregnant Ponies.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 193-194. 1 table. [2 refs.]

It appears that an inverse relationship exists between body size and gonadotropic hormone content in pregnant mares. Studies of the concentration in the sera of ten Welsh ponies showed that a concentration of 200-400 rat units per c.c. was uncommon, whilst in thoroughbred or draft mares the concentration never exceeded 200 rat units per c.c.—H. V. HUGHES.

SARTORIS, P. (1938). Contributo allo studio del comportamento follicolare e luteinico nell'ovaio della bovina, in stato di gravidanza. [**Folliculin and Lutein Content of the Ovaries of Pregnant Cattle**].—*Nuovo Ercol.* **43.** 201-214 and 241-268. 20 figs. on 10 plates, 3 tables. [Numerous refs.]

A detailed report of the histological examination of the ovaries of 58 cows at different stages of gestation. The findings are in accordance with facts already well known.—J. A. NICHOLSON.

TECHNIQUE AND APPARATUS

I. SCHÜTZ, F. (1937). Demonstration eines neuen Nährbodens. [**A New Culture Medium**].—*Zlb. Bakt. I.* (*Orig.*). **140.** *118-*120.

II. RASCH, K. (1938). Versuche mit dem Brillantgrün-Phenolrotagar. [**The Use of Brilliant Green-Phenol Red Agar**].—*Berl. tierärztl. Wschr.* Jan. 28th. 54-55. [3 refs.]

I. S. found polyvinylalcohol (C_2H_3OH) very useful as a substitute for agar.

The alcohol was first dissolved by boiling with broth and then Congo red was added. The bacteria under test (those of the coli-typhoid group, *Staphylococcus aureus* and *Bact. subtilis*) showed as profuse a growth as on agar. After addition of 3% milk-sugar and bromthymol blue, it proved a satisfactory medium for the differentiation of bowel bacteria. *Bact. coli* and *Bact. lactis aerogenes* appeared as yellow colonies on a bright reddish base, whilst *Salmonella typhi, S. paratyphi* B, and *S. enteritidis* appeared as blue or greenish-blue colonies.

II. R. states that brilliant green-phenol red agar is more useful than malachite agar, which is the official medium recommended in bacteriological meat inspection in Germany for differentiating *Bact. coli* and salmonella organisms. In the former medium *Bact. coli* organisms show up as whitish-green colonies, whilst those of the salmonella group have a distinct red colouration. The basis of the medium used by R. consists of meat broth, peptone water and agar.—M. F. Benjamin.

I. von Hennyey, E. (1937). Untersuchungen über die Gebrauchsfähigkeit von Bakterienfiltern. [**The Efficiency of Filters for Bacteria**].—*Zlb. Bakt. I.* (*Orig.*). **140.** 74-76. 1 table. [9 refs.]

II. Hofmann, P. (1937). Ueber die Brauchbarkeit der Jenaer Glasfilter zur keimfreien Filtration. [**The Efficiency of the Jena Glass Filter for Bacterial Filtration**].—*Ibid.* 76-80. 1 fig. [4 refs.]

I. A number of different organisms varying from 0·3 to 1·5μ in size, and suspended in saline from different media or in broth were tested on Berkefeld N filters. The suspension was poured on to the filter and placed in the incubator at 37°C. for periods varying from 30 minutes to 48 hours. Suction was applied at 0·6 atmospheres, and the filtrate inoculated into broth or on to agar slopes.

Salmonella typhi, S. paratyphi A and B, and the proteus bacillus grew through the filter in one hour. Therefore, the results of filtrations which require several hours must be accepted with reserve.

II. The new Jena glass filter was compared with a Berkefeld W filter by filtering various substances through both types.

Both retained saline suspensions of *Chromobacterium prodigiosum*, *Brucella melitensis* and *Bacillus mesentericus* spores. *Chr.p.* grew through one grade of glass filter in nine days, and through another grade and through the Berkefeld in 14 days. *S.t.* grew through both in two days.

The two grades of glass filter tested compared unfavourably with the Berkefeld when used to filter high titre *Br. abortus* agglutinating serum and tetanus toxin. The loss of titre in the one case and the loss of toxicity in the other was much greater with the glass filters than with the Berkefeld.

A 1% strychnine solution showed no loss after filtration through the glass filters, but considerable loss after filtration through the Berkefeld.—G. Slavin.

Morton, H. E., & Czarnetzky, E. J. (1937). **The Application of Sintered (Fritted) Glass Filters to Bacteriological Work.**—*J. Bact.* **34.** 461-464. 1 fig. [13 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 227. Signed G. S. Wilson].

Sintered glass filters have been used by several workers for different purposes. The present report draws attention to their value in bacteriological work. Observations were made with a sintered glass disc, 30 mm. in diameter, of " 5 auf 3" porosity. The disc was fitted into a funnel of 30 c.c. capacity, which passed through a rubber stopper into a test tube with a side arm. A pressure of about 75 cm. of mercury was applied during filtration. With this apparatus it proved possible to filter about 50 c.c. of a clear solution in half an hour. After

use the filters were boiled in distilled water for 15 minutes, and cleaned by heating to 80°-90°C. in concentrated H_2SO_4 to which a little $NaNO_{13}$ and $NaClO_4$ had been added. They were left overnight in this solution and rinsed thoroughly the following morning. About 200 c.c. of distilled water were then sucked through to remove the acid. For use they were sterilized by autoclaving at 120°C. for 30 minutes. Experience showed that they withheld the ordinary bacteria. They were found of value for the filtration of sugar solutions and of serum, as well as for the preparation of toxic and lytic filtrates. The filters carry a negative charge. They are particularly useful when small amounts only of material are available for filtration.

Swift, H. F., & Hirst, G. K. (1937). **An Apparatus for Grinding Bacteria at Low Temperatures.**—*Proc. Soc. exp. Biol., N.Y.* **37.** 162-166. 1 fig. [Copied *verbatim* from *Bull. Hyg., Lond.* **13.** 227. Signed G. S. Wilson].

Bacilli are frozen and dried by the lyophile or the desiccator method. They are then introduced into a stout Pyrex flask of one litre capacity containing about 500 ¼-inch stainless steel balls. The flask is cooled to –75°C. by a mixture of methyl cellosolve and CO_2 ice, and is rotated at 230 r.p.m. by means of an electric motor. The whole apparatus is well insulated. One to three hours' grinding is sufficient to disrupt 1 gm. of dried haemolytic streptococci.

Schwarzmaier, E. (1937). Hinweis auf eine zweckmässige Tropfen-Injektionsspritze. [**A "Single Drop Dose" Injection Syringe**].—*Berl. tierärztl. Wschr.* Nov. 19th. 717-718. 3 figs.

S. describes a syringe for intradermal injections and for the instillation of small amounts of mallein or tuberculin on to the eyes. The syringe is graduated to deliver a single drop of 0·01 c.c.—M. F. Benjamin.

I. Andres, T. (1937). Technik der Blutentnahme und der intravenösen Injektion beim Rindvieh und beim Schwein. [**Technique of Collection of Blood Samples and of Intravenous Injections in Cattle and Swine**].—*Schweiz. Arch. Tierheilk.* **79.** 383-387. 1 fig.

II. Sacharow, B. (1937). Zur Technik der sterilen Serumgewinnung bei der Maus. [**A Technique for the Aseptic Removal of Serum from Mice**].—*Zlb. Bakt. I.* (*Orig.*). **140.** 73-74. [2 refs.]

I. A. describes the customary techniques for collection of blood from, and injection of fluids into the milk vein in cattle and the ear vein in pigs.

II. The mouse is placed in a glass jar containing highly concentrated chloroform vapour. The latter produces auricular fibrillation and heart-failure in diastole. The chest is then opened, the heart grasped with forceps and a short needle (1·2 × 15 mm.) is quickly inserted into the right ventricle. It is then possible to draw up about 1 c.c. of blood from the heart.—M. F. Benjamin.

von Guoth, G. A. (1938). Bluttransfusion bei Pferden und Hunden. [**Blood Transfusion in Horses and Dogs**].—*Wien. tierärztl. Mschr.* **25.** 361-369 and 393-402. 1 fig. [Numerous refs.]

Blood transfusion may be satisfactorily carried out in domestic animals by the indirect method using 10% sodium citrate as an anticoagulant. Whilst it is better to carry out some simple test such as mixing a few drops of the donor's blood with serum from the patient, in order to detect the presence of iso-agglutinins, before the transfusion, blood groups are not so well marked in animals as in man. The blood may be given by any of the recognized routes for injections.

In horses, 1000 c.c. of blood can be safely transfused in 8-9 minutes, and, as a rule, there is practically no disturbance, even of the pulse rate, following such an injection. Repeated transfusions from the same donor to the same recipient do, however, produce anaphylactic shock, which is characterized by staggering, muscular tremors, sweating, rapid pulse, a rise of temperature and urination. Blood transfusion is contra-indicated in cases where organic disease of the heart is present. It is indicated after haemorrhage, in infectious disease and in such conditions as azoturia, etc.

In dogs, up to 200 c.c. of dog blood may be injected into the abdomen. After repeated injection there may be vomiting, haemoglobinuria and other signs of mild anaphylactic shock, but the symptoms soon pass off.

The injection of blood from one species of domestic animal into a different species is always followed by pronounced haemoglobinuria, vomiting, etc.; the number of erythrocytes in the circulating blood is rapidly reduced, and there may be a pronounced anaemia.—J. A. NICHOLSON.

SVEDBERG, T. (1937). **The Ultra-Centrifuge and the Study of High-Molecular Compounds.**—*Nature, Lond.* **139.** 1051-1062. 16 figs., 1 table. [Numerous refs.]

A description of the ultra-centrifuge itself and of its various uses is illustrated by diagrams and photographs.

In the case of substances of high molecular weight such as proteins and complex polysaccharides there are usually present in the same solution a number of molecular species differing in mass and shape, which can be sorted out into different zones by means of the ultra-centrifuge, the forces of which can go as high as " a million times gravity ".

Measurement of the " sedimentation velocity ", *i.e.*, the rate of settling of the molecules, or of the " sedimentation equilibrium ", *i.e.*, the balance between settling and diffusion reached after prolonged centrifuging (days, if necessary) then provides information on the molecular dimensions of the components of a solution.

The apparatus itself consists of a strong steel rotor driven by high pressure oil on the turbine principle, enclosed in a massive steel housing. Up to speeds of 20,000 r.p.m. the rotor can be supported on ball bearings. At high speeds, up to 160,000 r.p.m., journal bearings of oil-lubricated white metal are suitable. Various damping devices are adopted to prevent slight irregularities building up into dangerous vibrations. To diminish friction, rotation is arranged to take place in a medium of low viscosity, usually hydrogen, under reduced pressure sufficient to minimize friction without unduly diminishing conductivity of heat.

For low speeds the rotor may be of cylindrical outline, but for higher speeds an oval shape with two cell holes, one for the solution cell and one for the balancing cell, is chosen to reduce the strain. The cells themselves are sector-shaped with ultra-violet transparent windows to allow of studies of distribution of components by optical means during rotation, *i.e.*, by refraction or light absorption of phases of different concentration.

When using the absorption method, photographic exposures of the sedimenting column are made from time to time using a light of selected wave-length absorbed by the dissolved substance. The photographic pictures are then measured by a microphotometer and give the relation between c the concentration and x the distance from the centre of rotation. Each molecular species then comes out as a step on the c-x graph. If changes are measured by means of refractive index the different molecular species are recorded on the plate like lines in a spectrum.

If pictures of a finely ruled scale are taken through the sedimenting column of solution, by light of a wave-length which is not absorbed, and the displacement of the lines measured, the concentration gradient can be shown as a curve in which each molecular species appears as a maximum point.

The use of the ultra-centrifuge for the investigation of proteins is discussed at some length. For instance the stability diagram of *Helix* haemocyanin shows only one component at the isoelectric point, but on changing the pH the original molecule of weight 6,740,000 dissociates stepwise into halves, eights and sixteenths. These pH dissociation products represent perfectly homogeneous components.

Illustrations are given of the use of the sedimentation picture for studying pathological sera, viruses such as tobacco-mosaic, obscure components of milk proteins, and characters of respiratory pigments. The technique obviously provides a new line of approach for many problems of veterinary interest.—H. H. G.

ANON. (1936). **The New Ultracentrifuge Installation at the Lister Institute.**—*Lancet.* **231.** 874.

The two new ultracentrifuges have optical arrangements which make itpossible to observe and photograph the contents of the rotating cell. The smaller of the two machines, which is called the equilibrium centrifuge and runs at speeds up to 18,000 r.p.m., usually for several days and nights continuously, is used for the determination of absolute particle size or weight. The larger machine generates centrifugal forces up to half a million times gravity, and is used to measure the sedimentation velocity constant of pure proteins and of the components of a mixture. In the case of native protein mixtures such as blood-serum, it is possible to centrifuge these without previous chemical treatment and to determine from the photographs the concentrations in which the component proteins are present.
—R. ALLCROFT.

MISCELLANEOUS

EDWARDS, J. T. (1938). **The Veterinary Record—1888-1938: A Historical Review.**—*Vet. Rec.* **50.** 875-912. 9 appendixes. [Numerous refs.]

This is a very scholarly review of veterinary affairs in Great Britain from about 1828 onwards, leading up to 1888, the date when the *Veterinary Record* was founded by William HUNTING.

Something is said about foreign veterinary periodicals, by way of showing the advance in veterinary science at home and abroad, and the history of the past and present English periodicals is worked into the story so that the reader may appreciate the various events in perspective.

Numerous quotations, in the form of appendixes, are made from the writings of the great veterinary figures of the last century.—J. E.

MCKINNA, W. R. (1938). **Some Important Provisions of the Disease of Animals Acts.**—*Vet. Rec.* **50.** 939-944.

The author summarizes the chief provisions of the Diseases of Animals Acts and Orders, England and Wales, with regard to the operation of stock markets, including market accommodation for poultry, the prevention of spread of animal diseases and the prevention of cruelty to cattle and poultry, either while exposed for sale or in transit to and from markets.

He considers the question of over-stocking of dairy cows, the exposure for sale of cattle which have recently aborted, and the dressing of warble-infested

cattle. An outline is given of the procedure followed in dealing with reported cases of bovine tuberculosis, swine fever, parasitic mange of horses, asses and mules, anthrax, sheep scab and, very briefly, foot and mouth disease. Subsidiary regulations designed to prevent or control the spread of scheduled diseases are mentioned, including those governing prescribed methods of disinfection, boiling of animal foodstuffs, disposal of imported packing material and keeping of records of movement or transit of stock.—H. Burrow.

OFFICIAL AND OTHER REPORTS

Union of South Africa. (1937). **Annual Report of the Division of Veterinary Services.** [du Toit, P. J.]—*Fmg S. Afr.* **12.** 518-527. 9 tables, 5 graphs.

Field Work

There was a slight increase in the number of outbreaks of Anthrax, but the mortality was very low. In December, 1937, more than 50 herds were under regular tests for Tuberculosis, and much valuable information was obtained on the value of the intradermal test with locally-made tuberculin.

During the year, centres of infection with Dourine were discovered in the Western Province, the disease having apparently been introduced from the North West Cape area. An eradication scheme was adopted, and block (area) tests were commenced for the eradication of the disease. Progress in the eradication of East Coast Fever was made in all the provinces where it existed. The slaughter method, where it could be adopted, undoubtedly gave the best results.

No cases of Foot and Mouth Disease occurred in the Union, but the existence of outbreaks in Bechuanaland and Southern Rhodesia made constant vigilance necessary, particularly as smuggling of cattle was continually going on from Bechuanaland. Two outbreaks of Swine Fever, which occurred in the Northern Transvaal, were eradicated by slaughtering out. Although only seven cases of Rabies were recorded, the position was regarded as unfavourable, and there appears to be a tendency for the disease to spread, the incidence in the mongoose making its control very difficult.

Of the 93 outbreaks of Sheep Scab recorded in the year, 91 were in the Cape Province and Transvaal, most of them in the North-West Cape area.

Research at Onderstepoort Laboratory and Substations

Infectious Diseases.—The value of the saponin vaccine for Anthrax was tested on a very large scale, with good results. A vaccine made from avirulent variants of *Bacillus anthracis* was tried out experimentally, but the results in the field are not yet available. Two outbreaks of abortion in cows due to infection with *Trichomonas foetus* were recorded. This is the first time the disease has been encountered in the Union.

The work on Horse-Sickness was mainly devoted to improvements in the technique of vaccine production. The duration of the immunity and the antigenic structure of the different viruses were studied. In connexion with the study of Heartwater, the relationships of a number of rickettsia types from different animal species were studied. No success attended the attempt to acclimatize either Heartwater or Bluetongue in laboratory animals.

Other Diseases.—Investigations were made into the life-history of *Gaigeria* in sheep, infection being found to take place through the skin. A survey of the prevalence of *Gaigeria* in the Union was initiated. Also a tick survey of the Union was initiated which will take several years to complete. Under poultry diseases,

studies were carried out on avitaminosis-B, and breeding experiments for the elimination of CANCER in poultry were continued.

The use of bone biopsy as an aid in the diagnosis of nutritional deficiencies in cattle and sheep was introduced and found of great value. Experiments on the normal copper content of organs were continued and some experiments on the partition of blood proteins were initiated. In the course of the dietetic and biochemical work, the effect of iodine on reproduction in sheep and the influence of fluorine in phosphates on animal health were investigated. Vitamin A-deficiency was produced in cattle and vitamin D-deficiency in pigs, the latter leading to a bone disease.

A simple test was evolved to differentiate, at meat inspection, between the yellow discoloration in carcasses caused by plant pigments and that caused by icterus. A great variety of specimens were tested for different poisons. A proprietary preparation, lentin, was tested as a purgative for ruminants, with promising results. Investigations were carried out to ascertain the cause of an alarming mortality among sheep in the Orange Free State, but without success.

VARIOUS.—The influence of diet and chemical substances on the motility of the rumen, abomasum and large intestine of sheep was studied and various other experiments on the physiology of digestion in the merino sheep were carried out. The studies on the effect of environment on growth, development, production, etc., were continued, but some years will have to elapse before the results and the statistical evidence can be written up. Much attention was given to the study of synthetic fibres as substitutes for wool.—E. M. ROBINSON.

FIJI. (1937). **Annual Report of the Veterinary Division for 1936.** [TURBET, C. R.]—*Ann. Bull. div. Rep. Dep. Agric. Fiji, 1936.* pp. 50-59. 8 tables.

ANIMAL DISEASES.—TUBERCULOSIS was the most serious disease amongst cattle. Amongst the dairy herds supplying Suva, which have been regularly tested over a period of six years, less than 1% reacted. Amongst other cattle tested the percentage was over 10. The latter figure gives a more accurate indication of the incidence of the disease.

Losses due to CONTAGIOUS ABORTION decreased as compared with previous years. The use of live vaccine as an immunizing agent was continued in one badly affected area, with satisfactory results.

Minor disease conditions of stock were MASTITIS and INFECTIOUS KERATITIS of cattle, enteric infection of calves, OSTEOPOROSIS and BALANITIS in pigs, and FOWL POX, COCCIDIOSIS and BOTULISM in poultry.

GENERAL.—Poultry breeding was commenced by the Department of Agriculture with a view to improving the breed of fowls amongst Indian and Fijian small farmers.

New laboratory accommodation was provided for the Veterinary Division at the Government Bacteriological Laboratory.—H. M. S.

FIJI. (1938). **Annual Report of the Veterinary Division for 1937.** [STUCHBERY, H. M.]—*Ann. Bull. div. Dep. Rep. Agric. Fiji, 1937.* pp. 32-36. 7 tables.

The tuberculin test was extended for the first time to several dairies outside the Suva dairy area. The cattle tested numbered 2,535, with 11·95% reactors. In the Suva dairy herds, 894 were tested with 1·54% reactors. Contagious abortion caused negligible losses. Kidney worm of swine was well controlled. Poultry losses from disease are high. The importation of cattle from Australia was prohibited by proclamation owing to the outbreak of ephemeral fever in that country. Jersey dairy cattle do not appear to do as well as Friesians and Shorthorns. Two

Red Polled bulls were imported by the Department of Agriculture. The dairying industry had a good year.

The quantity of butter manufactured was 637,259 lb. and of ghi, 189,129 lb. The newly established government poultry farm at Nasinu made reasonable progress.—C. R. TURBET.

I. LECLAINCHE, E. (1938). La situation sanitaire en 1937. [**The Animal Diseases Situation in Europe in 1937**].—*Bull. Off. internat. Epiz.* **16.** 5-16 and 92. Discussion pp. 285-292. [1 ref.]

II. LECLAINCHE, E. (1938). Rapport administratif du Directeur de l'Office pour l'année 1937-1938. [**Administrative Report of the Director of the Office International des Epizooties 1937-1938**].—*Ibid.* 259-265.

III. —. (1938). Résolutions adoptées dans la 12e Session du Comité de l'Office International des Epizooties. [**Resolutions Adopted at the 12th Session of the Committee of the Office International des Epizooties**].—*Ibid.* 415-416.

I. The year was marked by an outbreak of FOOT AND MOUTH DISEASE in virulent form which spread over all parts of Europe: there is nothing of particular note to record about other diseases. As usual, notes are given on anthrax, bovine tuberculosis, swine erysipelas, glanders, blackleg, epizootic lymphangitis, dourine, swine fever, sheep pox, rabies, and avian infections.

II. L. again deplores the incompleteness of disease statistics received. At a special meeting of four members of the committee of the Office in January, 1938, it was arranged that trials on an international basis should be carried out in France on certain methods of immunization against F. & M. Disease. The French government placed the Research Laboratory at Alfort at the disposal of the Office. The actual work is to be carried out by research workers sent by countries where promising new methods of immunization have originated.

Albania and Algeria joined the Office during the year.

III. (a) F. & M. Disease.—It was agreed that slaughter is the most effective control method, and that it should be used as much as possible. Disinfection, stand-still orders and prophylaxis by sero-infection should be used where practicable.

(b) Sale of remedies.—It was agreed that sale should be prohibited until remedies had been scientifically tested.

(c) Influence of livestock management and feeding on infectious and parasitic diseases.—The importance of these factors was recognized and the desirability of research on the subject was expressed.

(d) Prophylaxis of Epizootics.—The conclusions of MÜSSEMEIER and of VERGE were supported.—J. E.

BOOK REVIEWS

MÖNNIG, H. O. [Dr. Phil., B.V.Sc., Professor of Parasitology, Faculty of Veterinary Science, University of Pretoria; Veterinary Research Officer, Onderstepoort, South Africa]. (1938). **Veterinary Helminthology and Entomology. The Diseases of Domesticated Animals Caused by Helminth and Arthropod Parasites.** pp. xviii+409. 264 figs., 12 plates, 1 table. [Numerous refs.] London: Baillière, Tindall & Cox. [2nd Edit.] [8vo] [20s.]

The second edition of this excellent text-book has followed very quickly after the first publication [*V. B.* **4.** 795.] so that it is not surprising to find an addition of only seven pages to the text. The revision has been very carefully carried out, however, and several small additions have been made to accounts of life-histories.

The most notable alterations, however, are found in the account of treatments ; the author's new treatment by mouth for nodular worm (*Oesophagostomum columbianum*) in sheep with a mixture of copper arsenate, copper tartrate and calcium hydroxide has been substituted for the treatment *per rectum* previously recommended. N-butylidene chloride has been added to the list of recommended treatments for strongylosis in horses, and intratracheal injections, while the animal is held on its back, for husk in sheep.

An alteration, the reason for which it would be interesting to know, is the reduction of the dose of copper sulphate and nicotine sulphate for trichostrongylosis and monieziosis in sheep and cattle to one third of that recommended in the previous edition.—E. L. TAYLOR.

SCHILLING, C. (1938). [Prof. Dr. Abteilungsdirektor am Institut Robert Koch i.R.]. Die Methoden der experimentellen Chemotherapie. [**Methods of Experimental Chemotherapy**]. pp. 104. 18 figs., 1 table. [Numerous refs.] Jena : Gustav Fischer. [8vo] [RM.4.50].

In this short book the author has attempted to describe systematically the main methods which have been used in experimental chemotherapy and the advances made. He has succeeded in producing a book which contains a vast amount of information, despite the necessity for condensation, and the wide scope of the subject.

The methods of testing the value of drugs both *in vitro* and *in vivo* are discussed, and also the laboratory animals which may be used for experiment, the methods of infecting them, the various methods by which drugs may be administered, and the variation in the action of drugs as they affect the parasite and the host. The chemical composition of the more active compounds is given, and the interrelationship of the members of the various groups.

After discussing the treatment of bacterial, protozoan, helminth and virus infections and the methods of estimating the efficacy of treatment, the author goes on to discuss the experimental work which has been done on the theory of chemotherapeutic action, and such subjects as interference, drug fastness and the persistence of drugs in the host.

The book is a valuable addition to the literature available, and if some recent work has not been included, and other work seems to have been accepted too readily, *e.g.*, the action of acaprin on theilerial schizonts, yet it gives a very complete picture of modern methods of testing the value of drugs and endeavouring to ascertain the mechanism of their action.—U. F. RICHARDSON.

OPPERMANN, T. [Prof. Dr. Direktor der Medizinisch-forensischen Klinik an der Tierärztlichen Hochschule zu Hannover]. (1938). Die Fohlenlähme und ihre Bekämpfung. [**Navel-Ill in Foals and its Control**]. pp. 56. 3 figs. [Numerous refs.] Hanover : M. & H. Schaper. [8vo] [RM. 1.60].

The object of the booklet is to provide up-to-date information on an important subject in a form readily accessible to all veterinary practitioners, and this aim is furthered by its very low price.

O. considers that domestication is the basic cause of the various diseases of foals, and goes on to describe the different types and their treatment along the lines of recent work in Germany and elsewhere [*V. B.* **6.** 157].

He brings in a new causal agent of foal disease, *viz*, the virus of equine infectious anaemia, which, he considers, is capable of causing rapid death in foals during the first few days of life.

The mode of infection in navel-ill is discussed in some detail and some interesting anatomical distinctions between the foetal circulation in foals and that in

calves are brought out to account for the genesis of equine navel-ill and calf diarrhoea.

The cutting and ligation of the navel cord is condemned, and its tearing by force followed by disinfection is urged.

O. considers that an over-abundant milk supply is an important factor in the pathogensis of navel-ill, and advocates elaborate dietetic rules, utterances which strike the reader as opposed to the doctrine of return to nature emphasized in the introduction.

The literature on prophylaxis and curative treatment is reviewed rather uncritically, so that the reader hardly knows what to use and what to leave unused.

On the whole this concise treatise, with its 86 selected references dating from 1926 onwards, is very welcome.

[The term " Fohlenlähme " and the English equivalents " joint-ill " and " navel-ill " are rather unsatisfactory in the light of the present knowledge on diseases of young foals. It would be better to name the infection in each case]. —J. E.

—. (1937). **The Onderstepoort Library Index 1937.** pp. 153. Pretoria: Govt. Printer. [4to] [2s. 6d.]

The chief advantage of the system used for this index is its simplicity; any possible waste of time or confusion that might even so arise can be easily avoided if the two introductory pages of explanation are read. The system caters mainly for workers on specialized subjects; it is centralized, titles being referred as far as possible to wide main headings, which are then further subdivided. Cross-indexing is usually avoided, but an alphabetical key is included to show the reader where to begin his search.

The subjects are set out under 29 main headings numbered serially, as follows :–

1. Anatomy; 2. Animal Husbandry; 3. Bacteriology; 4. Biometry; 5. Botany; 6. Chemistry; 7. Embryology; 8. Entomology; 9. Filterable Viruses; 10. Helminthology; 11. Histology; 12. Human Medicine; 13. Hygiene; 14. Immunology; 15. Medicine; 16. Obstetrics and Gynaecology; 17. Psychology, Animal; 18. Pathology; 19. Pharmacology; 20. Physiology; 21. Poultry; 22. Protozoology; 23. Radiation; 24. Skin Diseases; 25. Surgery; 26. Toxicology; 27. Veterinary Science; 28. Wool, and 29. Zoology.

These main headings are then subdivided as may be necessary; in most cases there are five or less subdivisions. An example will show how the system is applied. A reader looking for a reference to *Babesia caballi* would turn first to the key. Here he would find that references to this organism are in the category 22 : 4 : 4 : 5 : 3 : 2. Reference to the main index shows that heading 22 is " Protozoology "; 4 is a sub-heading under this, " Sporozoa ", the second 4 is a further sub-heading, " Haemosporidia ", 5 is the sub-heading " Babesidae ", 3 is a subdivision of this, " horse ", and the final 2 stands for the organism itself, *Babesia caballi*. The card index consists of indicator cards with title cards behind them. On the indicator card is written the name of the subject, and its index number, *e.g.*, Protozoology . . . 22; Leishmania . . . 22 : 2 : 1; *Babesia caballi* . . . 22 : 4 : 4 : 5 : 3 : 2.

This system of classification is especially suitable for a library dealing with a specialized subject, as very detailed subdivisions are possible; under " Toxicology", for example, there is a division numbered 26 : 6 : 87, representing " Toxicology : Poisonous Plants : Zygophyllacea ". Under this system the fact that there is such a large number of plant families to be indexed is no reason why they should not all be dealt with as separate subdivisions.

Addresses of Bureaux.

IMPERIAL BUREAU OF SOIL SCIENCE,
Rothamsted Experimental Station, Harpenden, Herts., England.

IMPERIAL BUREAU OF ANIMAL NUTRITION,
The Reid Library, Rowett Research Institute, Bucksburn, Aberdeen, Scotland.

IMPERIAL BUREAU OF ANIMAL HEALTH,
Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge, Surrey, England.

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INDEX VETERINARIUS

HALF-YEARLY ISSUE.

It has been decided that with volume 6 of *Index Veterinarius* and onwards the issue will be half-yearly. The *Index* will, therefore, appear according to the following schedule :–

Vol.	*No.*	*Indexing Period (indexing done).*	*Date of Issue.*
6	1	1938—Jan.-June	December, 1938.
6	2	1938—July-Dec.	June, 1939.

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